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MODERN Machine Shop

OCTOBER, 1941
VOLUME 14 • NUMBER 5

Contents

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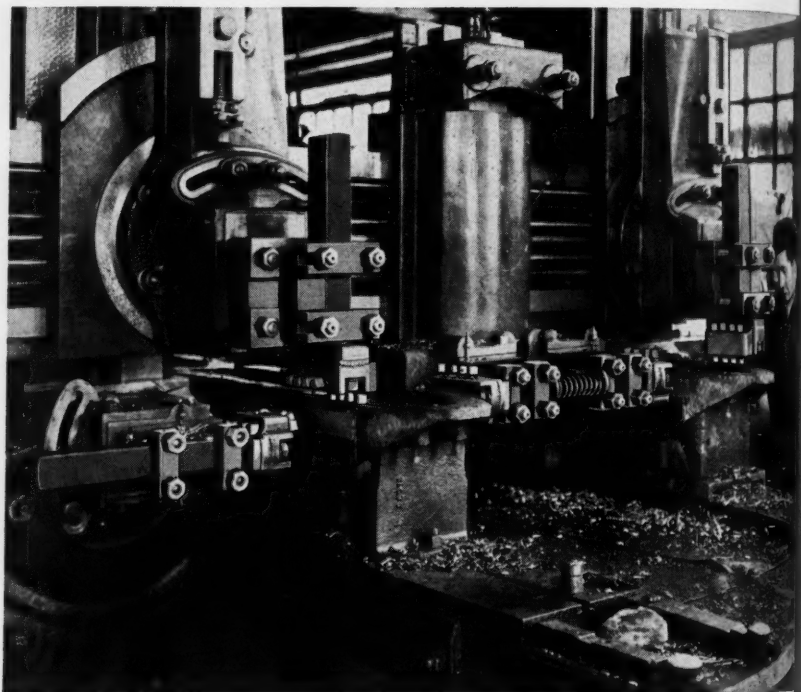
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October,

MODERN Machine Shop

CINCINNATI, OHIO

OCTOBER, 1941

VOL. 14, No. 5

We Present --

—as the feature article in this month's issue—an outline of the methods employed by Lockheed to select employees that will fit into the aircraft industry and to determine the type of work for which each is best fitted. * * * It would be better for both management and men if more manufacturers selected men for their jobs by this or some similar method. * * * The vast waste due to the square-peg-in-round-hole method of placing men in vocations has long been known.

—as our second article this month, a highly instructive article on the grinding and lapping of various types and kinds of gages. * * * This is the sort of material that is never at hand when it is wanted—and consequently is worth saving.

—on page 116—a description of a recently completed tool and gage shop which is up to the minute in every respect—design, layout, type of construction, and equipment. * * * Here is the latest in fluorescent lighting, floors of three-and-one-half-feet concrete slabs isolated in heavy cork insulation, air conditioning for the gage grinding room and testing laboratory, the newest in gage manufacturing equipment, and so on. * * * This article is also worth saving against the day when a new plant may be necessary.

—on page 130, another article on grinding—but this time on the grinding of threads. This is the third and last article of the series "Thread Grinding Applications" by John W. King and presents some of the work that is finished by this method. We hope this series has been useful to our readers. * * * But, after all, that is the gage by which all MODERN MACHINE SHOP articles are selected.

—the usual half dozen good "Ideas from Readers" and the regular service features.

October, 1941

MODERN MACHINE SHOP 91



The Lockheed Hiring Line, from which an Average of 4,000 Employees Per Month Are Hired by Lockheed and Vega

Employee Selection Methods at Lockheed

An outline of the methods employed at Lockheed Aircraft Corporation in the selection of workers for the different types of work

By MAXWELL STILES

Lockheed Aircraft Corporation, Burbank, California

Temperament.

Aptitude for a particular type of work.

Special talents or skills.

Intelligence.

THERE, in order of their importance, are the prime essential requirements of a good employee in the eyes of the Lockheed Aircraft Corporation, which, including its subsidiary, the Vega Airplane Company, now has more than 45,000 on its payroll. The Lockheed-Vega Central Employment Division has been hiring

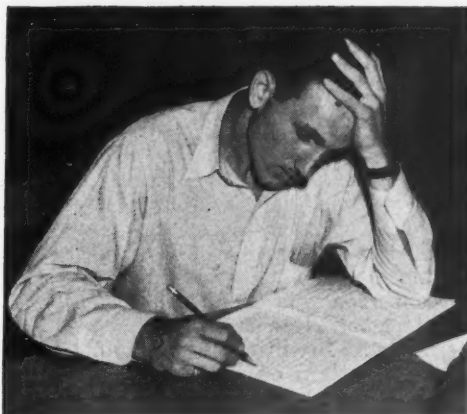
men at a rate of four thousand a month for many months past and plans to continue to do so indefinitely, perhaps as long as the defense emergency exists.

Each new man hired must qualify under all of the above points, in addition to meeting the approval of specially trained interviewers on such matters as educational or work background, personality and general appearance. It is not sufficient merely that he be able to handle a rivet gun or do a job of welding quickly and effi-

Answering the 300-Odd Questions in the Temperament Test

ciently. He may be one of the most highly skilled men in his line available, but there is no place for him at Lockheed or Vega unless it is indicated that he is a well adjusted individual who can work in harmony with those about him. He may have the I. Q. of a borderline genius, but perhaps he should be a certified public accountant, a schoolmaster, poet or musician instead of a Lockheed engineer.

Or maybe he came to the Lockheed hiring line hoping to get on as a sheet metal worker, but was found to be better qualified for a job in final assembly, dispatching or factory tabulating. Perhaps the boy who applied for a job in the paint shop or foundry was found to possess other talents and is now working his way



up as a jig maker or machinist. The proper placing of a man in a department where he will be happy, and find full opportunity to expand and rise in the ranks, is considered quite as important as the decision whether he should be hired at all.

To serve both interests, the two companies have set up a series of tests which not only determine an applicant's aptitudes for certain

types of work in an aircraft factory, but which also subject him, for his own good as well as that of the companies', to a sort of psychological X-ray. The picture that results is a chart or profile which offers a measure of what might be called the "personal make-up" of the applicant, which assists in matching the person-



The Applicant Presents His
Credentials and Application
Blank to a Preliminary
Interviewer

ality of the job-applicant with the job and with the personalities of the men he will meet in the department in which he is to be placed.

The temperament test, while of utmost importance because of what it reveals, is not difficult. It consists of approximately 300 questions to which "yes" or "no" answers are required. Not all of the questions are counted in the rating. They are so arranged that it is almost impossible for a person who is unfamiliar with the test to create an artificial temperament. In answering the questions, a pattern of disposition is established which gives the skilled interviewers an objective view of each applicant.

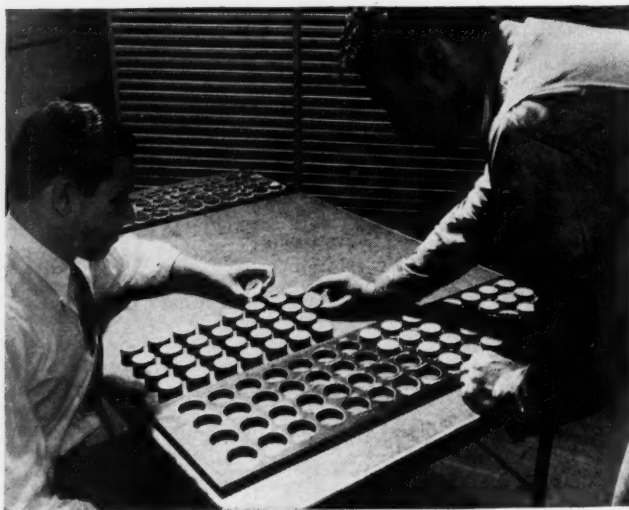
Special aptitude tests, such as placing and turning little round blocks in companion holes, which reveal coordination and dexterity of the individual, or the "wiggly block" test, which discloses the person's sense of spacial relationships, are also given applicants for certain types of work.

In the four years that these tests have been in use at Lockheed—the

first aircraft company in the industry to turn to them for help in measuring the qualifications of an applicant—approximately 200,000 of the three-quarter-million who have shown up in the Lockheed hiring line have been tested. Of these, more than 45,000 have been hired by Lockheed. Vega, often at a rate of a thousand or more a week. More than ninety per cent of placements have proved successful, the less than ten per cent of unsuccessful placements being exceeded two and three times by most other companies in the business.

It is not always necessary for an applicant to appear in the hiring line in Burbank, California, home of the Lockheed organization. The Lockheed employment department is using the facilities of more than 1,500 offices of state employment departments in all sections of the country to test applicants.

The importance of the temperament test was stressed recently by Randall Irwin, Director of Industrial Relations for Lockheed and Vega, when he declared: "More than seventy-five per cent of failures in our business are due to temperament faults — often termed 'personality traits.' An applicant is considered to be a poor employment risk unless he has a well-balanced temperament."



Manipulative Test at Lockheed. The employee checks with Stop Watch the Time Required to Place Blocks in Their Respective Openings.

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The "Wiggly Block" Test for Sense of Spatial Relationships. It Is Like a Huge Nine-piece Jig-Saw Puzzle and Must Be Put Together against Stop Watch Time



good character and a reasonably healthy outlook on life. An important factor which is included in this quality of temperament is ability to get along with others.

"Wise and continuous guidance and counseling, based upon the results of psychological tests, can work miracles in helping young men to overcome their weaknesses and direct them into lines of work for which they are well adapted."

The temperament test, which plays so vital a role in this picture, is described by Robert C. Storment, psychometrician in charge of the testing department, as "an analysis of a man's temperament or disposition." It might further be described as a study of the individual's adaptability in meeting and coping with the many personal problems that are constantly arising where men are thrown together in large numbers in a vast and complicated undertaking.

From it can be determined the thought pattern of the individual and whether he can successfully be assigned to a position in which close attention must be paid to details; whether he may become easily bored by routine operations; whether he can adjust himself to precision work; whether he does his best work with others, or alone; whether he has latent talents for leadership; whether he has due regard for the rights of his fellow employees; whether he gets

along easily with others, or is inclined to carry a chip on his shoulder; whether he is willing to accept responsibility, or prefers to follow others; and scores of other psychological reactions that are an index to the type of person he is, and how far he may be capable of going.

The temperament profile of an individual which results from the manner in which he answers the 300 odd questions covers a wide range of components, including: Degree of stability or self control, anti-social tendencies or selfishness, hysteria, degree of fluctuation between elated and depressed emotional types, degree of imagination and tendency to "day dream," fixity of purpose, stubbornness and determination, and epileptic tendencies.

"Because of our experience, we only hire men who have been proven by the tests to be mentally sound and temperamentally stable," Storment explained. "They are what we call well adjusted individuals, normally social in their outlook."

"Very infrequently is an employee dismissed from Lockheed. For the year 1940 the monthly dismissal rate



The Successful Applicant is "Mugged" by the Identification Bureau before He Goes to Work on the Job

at Lockheed never rose above four per cent of the total work force, and generally fluctuated between one and two and one-half per cent. The same figures for the aircraft industry never dropped below three and one-half per cent, and at one time rose above seven per cent.

"We have found that in practically every case of dismissal, the temperament chart will show a characteristic that would explain the actions that led up to the discharge. This is also generally true in the cases of employees who are mediocre on some jobs and highly successful in others. There can be no doubt that the temperament test in the hands of the trained analyst permits us to more quickly bring the right man and the right job together.

"When we find an individual with the aptitude and intelligence to be successful in his work turning in a below par performance, we can usually trace it to the fact that, for one reason or another, we have placed him in a position for which he is not temperamentally best suited. In this

case, the temperament test can be used as a guide in making subsequent changes for the employee."

As examples of the relationship of temperament and the job, Stormer cited the following cases taken from his files (names have been omitted for obvious reasons):

CASE A.

IQ 123. This man's temperament chart showed him to possess a strong sense of self control, and to be utterly lacking in any of the selfish tendencies. It also revealed that he would have fair enthusiasm toward his work, but would be unable to make social adjustments quickly and easily.

At the time of his application, a position was open in the testing section, where it would be necessary for him to meet the public. His inability to make friends quickly and easily, and his lack of push, as indicated on his chart, at once became apparent. After several months he became discouraged and dissatisfied. A transfer was arranged to the engineering

it must, of course, be appreciated that it is not always possible to match the man and the job immediately. It is sometimes necessary to place a man temporarily in an available position for which the ideal man cannot at once be found. In such

CASE B.

IQ 99. A sample of an engineer, was better. His chart showed a moderate sense of initiative. He was a graduate of this technical school. The fact that he was an engineer) the Lockheed

His work was passable. He was into the transfer. Quite dissatisfied. ment he was in the section. He took advantage of his past training. He was actually transferred to where he had a background. Him to certain work that he was so eager to do. He had not

department, where he was given an opportunity to do considerable work in research. Almost immediately his attitude toward his job changed. In a short time (6 to 8 months) he merited wage increases up to the top of his classification.

CASE B.

IQ 99. This is an interesting example of a man who trained to be an engineer, but who temperamentally was better suited to personnel work. His chart showed that he possessed a moderate degree of control, but in no sense could he be termed conservative. He was definitely more of the sales type. However, because he was a graduate engineer (he had taken this technical training in spite of the fact that his intelligence quota indicated he would not make a top-flight engineer) he applied for a position in the Lockheed engineering department.

His work from the outset was only passable. On some occasions it fell into the "doubtful" classification. Quite discontented, he applied for a transfer. Before leaving the department he was given a chance in various sections hoping to take advantage of his past training. Eventually he was transferred to personnel, where his technical background permitted him to understand certain phases of the work that would not be so easily comprehended by one who had not had the train-

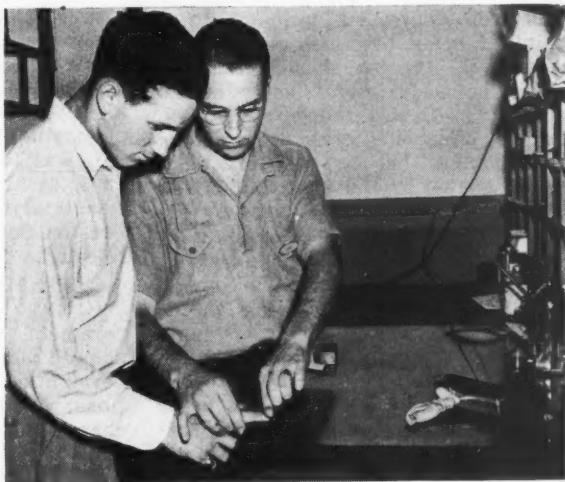
ing. Immediately he became personally more satisfied with his own work and happier on the job.

CASE C.

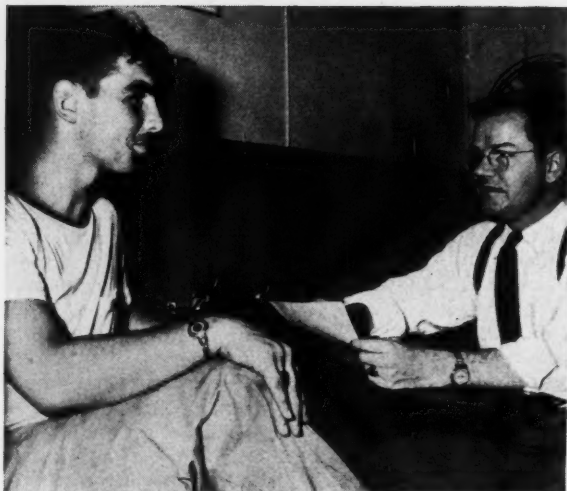
IQ 119. This man's temperament chart at once revealed that he was cautious, conservative, and not a self-seeker; with worlds of interest for those things that had not been reduced to statistical formula. It also showed that he had drive and patience. It was the picture of a man who loves projects and the painstaking working out of them.

He was hired in the engineering department and assigned to research, where he was responsible for construction of tests, collection of vital data relative to validation and standardization of tests, and similar work. He has been highly successful at it, because in his make up was a strong liking for detail work, as displayed in a very strong normal. He also possessed the drive and push required to follow through to the last detail.

His intelligence, as shown by an IQ of 119, was high enough to enable him to handle this type of work, and yet not so high that he would



The Fingerprints of Each Person Hired Must Be Sent to Washington for Identification and Filing



Robert L. Stormont (right), Manager of the Lockheed Vega Central Employment Bureau and Psychometrician in Charge of the Testing Program, Gives an Applicant His Final Interview for Placement

possess an impractical or too academic approach to the problem. The caution in his make up (which prevented him from jumping at conclusions) was indicated in the borderline depressive component of his temperament profile.

CASE D.

IQ 100. The temperament profile of this employee indicated that he was well controlled, but not to a point of being over-cautious or conservative. It also showed that he would be social and friendly in his contacts with his fellow employees, but not effusive. Among other things it indicated that he was practical, had both feet on the ground, and was sufficiently stubborn to stand by his decisions, but not in an offensive way.

He was placed in the engineering department, where he has become a highly successful engineering checker. Very few errors get by his eagle eye. The combination of control and persistence give him the drive needed to follow through on the job he is doing. His enthusiasms are also sufficient to provide ample mental alertness, and yet not sufficient to require

a great deal of variety in the type of work he is doing. With this man "a job well done is of first importance."

CASE E.

IQ 77. Noted in this applicant's temperament chart, when he came for his interview, was the following: "Often out of control; type often found in state hospitals; may have prison record if normal is low (it was very low); extremely selfish; easily embarrassed; stubborn, headed and conceited; revengeful and bitter."

The final comment of the interviewer was: "Unacceptable. Strictly anti-social. Would expect this candidate to have had some definite trouble. Has not, as yet, any adjustment in his attitude. Extremely poor employment risk."

It was later found that this applicant, at the time he took the test, was applying for release from the Preston School of Industry. He was rejected.

CASE F.

IQ 123 (Very Superior). The temperament chart of this applicant showed him to be very erratic and never in complete control of his emotions; at times self-sacrificing, with changeable interests; sad, worrisome and pessimistic. It also indicated that he gave way to suicidal

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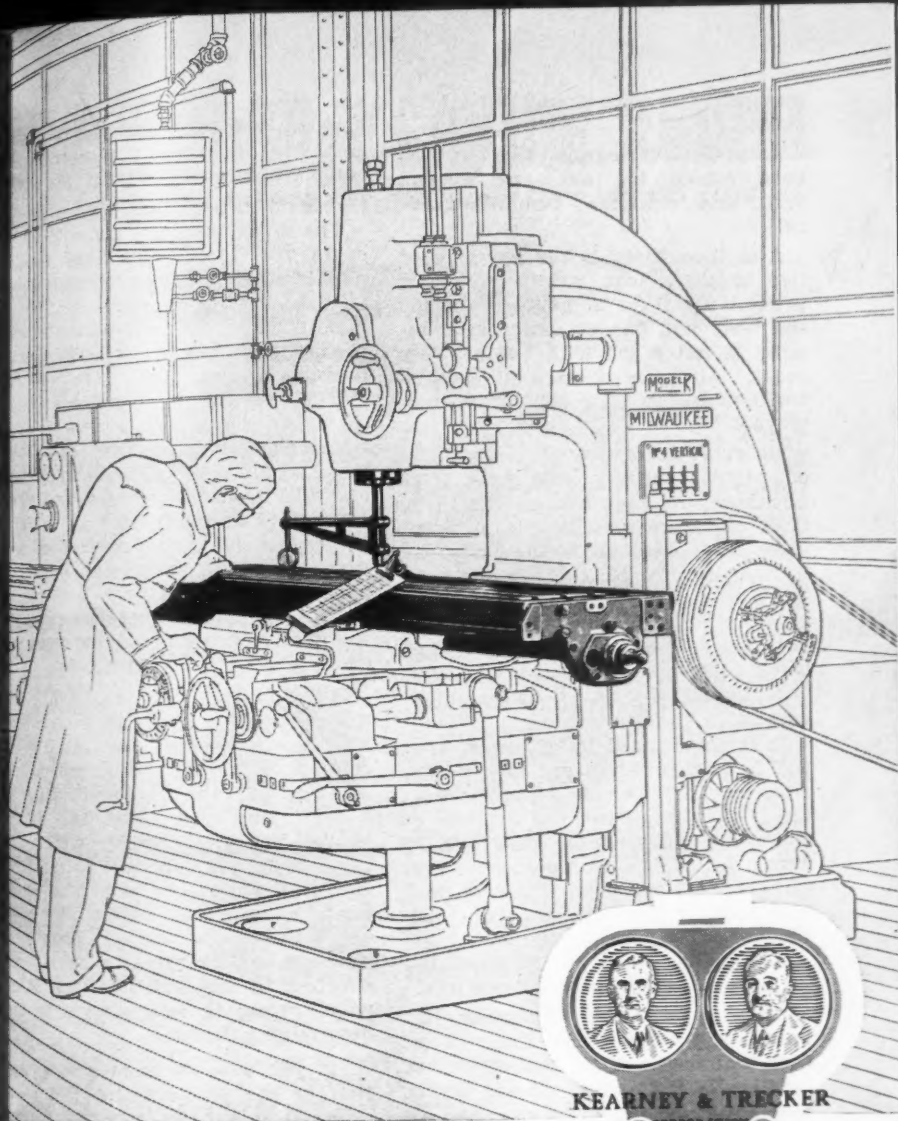
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thoughts, and occasionally felt a little abused.

Later it was learned that he had been forced to take an "alcohol cure," and had finally committed suicide.

And then there is the example of two brothers who wrote: "It's our present ambition to go to work for the best but hardest aircraft company to get a job with on the west coast. Also, the thing that leads us to a choice is your school for employees."

As evidence of how the right type of people, seeking employment at Lockheed, are approved by the tests, it is of interest to note that when these boys were given the tests following receipt of their letter, one brother was found to have an IQ of 131 (borderline genius) and the other 124 (very superior). Both had what were considered at Lockheed to be exceptionally good temperament curves.

It is emphasized by Storment that the tests themselves are not conclusive, but that when combined with interviews they raise the average of successful placements from five to seven out of ten, to nine out of ten. "One out of every ten that we pass will fall by the wayside," he said. "We can be consistently wrong on one man, but give us 100 men and we will not miss the curve one iota."

"Out of each ten applicants we test, we probably hire four. That does not mean that the other six failed. Very frankly, we are trying to get the best men we can, and all of those who were not accepted were not necessarily found lacking, but were found not to be endowed with the natural aptitudes and attitude that we felt would enable them to compete successfully with the field. One does not 'flunk' the tests, in the sense that he falls below a given grade. There is merely a dividing

line above which there are certain applicants who appear to be better employment risks than others in competition against them for given jobs that are to be filled."

The block tests are given to applicants for those jobs that require nimble fingers, a quick hand, speed or dexterity in performing a given task, such as riveters, drillers or stenographers. The blocks are placed turned against the stop-watch. "Wiggly block" tests, which determine a person's sense of spatial relationships, are given applicants in hand forming, layout, template, and die, or engineering work. The so-called "wiggly block" is actually a glorified jig-saw puzzle in nine sections which must be put back together against the stop-watch, as a means of determining how quickly the applicant can determine what is what or what goes where.

All who take the tests are given a final interview by an interviewer who has gone over the test paper, references, scholastic background and other elements in the consideration of a new employee. The final interviewer has pretty well made up his mind about the applicant by the time he sits down before him. The applicant has been well analyzed by then and whether the probable decision is "thumbs up" or "thumbs down," the courtesy of the final interview is always given; it may always be a determining factor.

"If you were to answer one question in the temperament test as a criminal might be expected to answer it," Storment pointed out, "it would not necessarily mean that you have a criminal tendency. But if you answer a great many of them that way, pardon us if we are a little hesitant about hiring you. The only difference between the adjusted and the maladjusted individual is that the adjusted controls his impulses and the other

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—A Statement by the
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does not, and the applicant has a far better chance of winning the approval of the testing department if his answers indicate that he is able to keep his emotions under control."

"Isn't it rather easy to bluff your way through by answering the questions in a way you think they should be answered, rather than in a manner that would reveal your true nature?" Storment was asked.

"Very seldom can you get away with bluffing," he replied. "When you try to cover up one line of thought you are most apt to invalidate the test by slipping up somewhere else. In covering up on one question, unless you are trained in abnormal psychology, you are pretty apt to upset the apple cart and turn in an impossible pattern."

Storment said that, generally speaking, women are more frank with the test than the average man. There is not much to choose between the two sexes in brains or intelligence, in ability to acquire knowledge or in speed in going through the IQ test. In the sense of spatial relationships, as revealed by the "wiggly block" test, the average woman is found to be less adept than a man.

"This is an aptitude the woman rarely has to cultivate, however," Storment explained. "It shows ability to follow through on a plane design, layout, hand forming, sense of proportion, what fits where. Women dressmakers and pattern makers should do as well as men in this test."

In the manipulative tests the woman is usually superior, which may be due to the fact that applicants for the type of work available to women at Lockheed are, as a rule, girls who have had some secretarial training or experience and whose fingers through use on typewriter keyboards or adding machine have become more nimble than the average male applicant without previous factory experience.

The average woman, however, is better able to coordinate hand and eye which is why women are usually faster than men on hand piece work in typewriting. Recently when an applicant for a job as stenographer broke the company records for speed in the manipulative tests, Storment hazarded a guess that "You can probably typewrite about 120 words a minute." Storment had never met her at a typewriter.

"I hold the Kentucky state championship and have done 130 words a minute," she replied.

Storment was asked whether the tests indicate that there is an age at which men or women begin to show a definite deterioration in their ability to pass the tests high enough to compete with younger people.

"No," he replied, "I am not qualified to set a point of demarcation. I have had men of 70 pass all the tests very high. If natural aptitudes are used, and if there is not an outside deteriorating influence such as poor health, the results remain pretty well standardized regardless of age. But if natural aptitudes are not used, they wither away, and they will do that at 30 as readily as at 40."

"However, one does add to knowledge and experience when past the age of 30 is the maturity period for temperament, while at 19 the ability to cope with a given situation and to pass on to the next in the shortest time, is pretty well set. The last constitutes the measure of intelligence, which is pretty much the same at 50 as at 20, providing the individual has kept active and used his intelligence in the interim."

On the subject of whether a college education gives a person an edge in passing tests, Storment had this to say:

"If you are endowed with intelligence, you have it. It's natural. College means only that you have had a chance to develop it and gain know-

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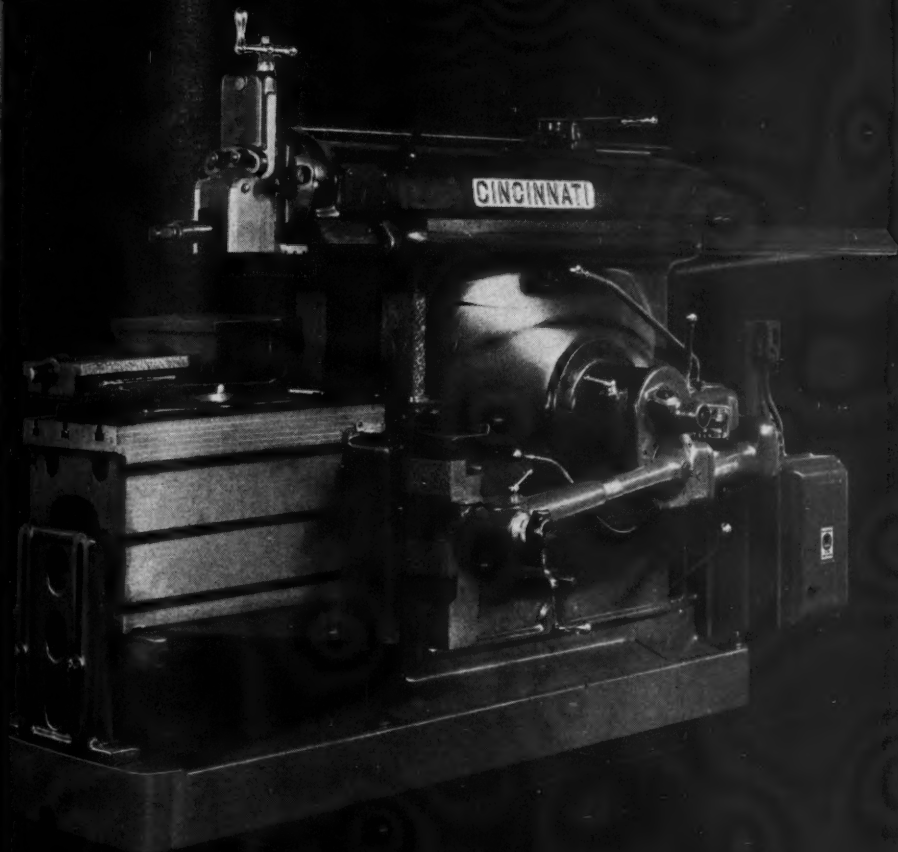
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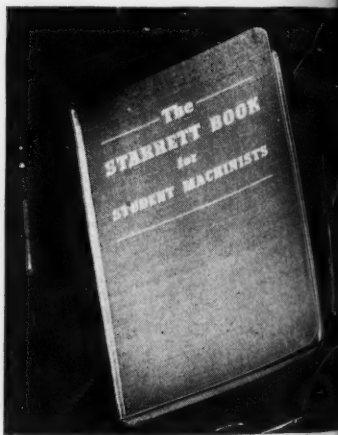
In addition to useful facts on how to save time, money, and labor both in production and maintenance work through Metco Metallizing, the bulletin describes in detail the Metco "Controlled Power" Metal Spraying Gun Type 2E as well as the standard Type E gun. Also included are descriptions of the complete line of Metco Metallizing Accessories. Copy of bulletin free upon request.

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In order to make the book completely up-to-date and as practical and useful as possible, the text was prepared in co-operation with a number of leading vocational school and industrial shop

training instructors. The book contains 184 pages, over 200 diagrams and photographic illustrations, and 30 reference tables. It is completely indexed and covers a range of subjects and practices with which the student young machinist is expected to be familiar.

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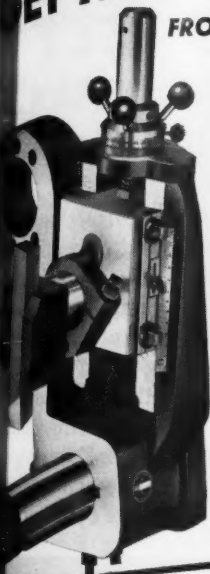


Drawings; Precision Tools and Measuring Practices; How to Read a Micrometer and a Vernier; Fits and Limits; Tolerance; Bench Work; Chipping; Grinding; Metal Sawing; Drilling; Lathe Work; Screw Threads and Taps; Toolmaking; Jigs and Fixtures, and more.

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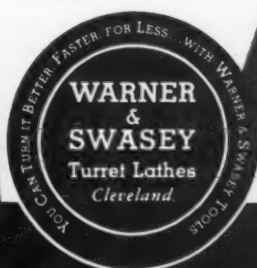
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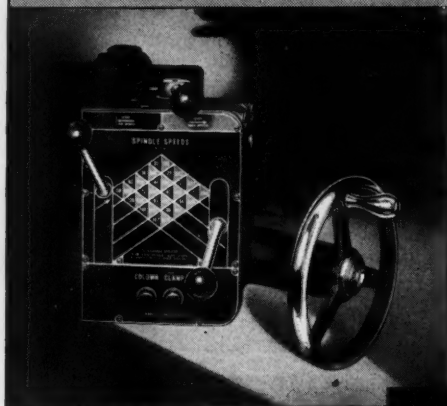
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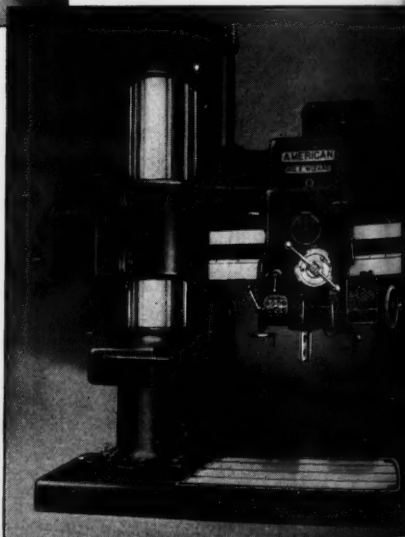
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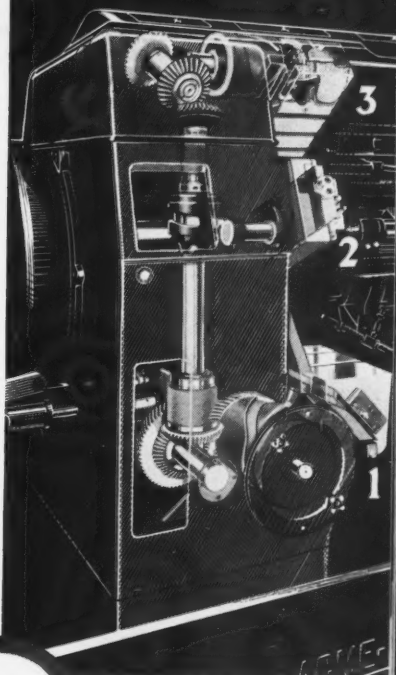
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Finishing Plug and Ring Gages to Size

Because gage manufacturing plants are working almost exclusively on government orders, many shops are now faced with the necessity of making their own gages. Here are some pointers on gage grinding and finishing

By H. J. WILLS

Engineer, The Carborundum Company

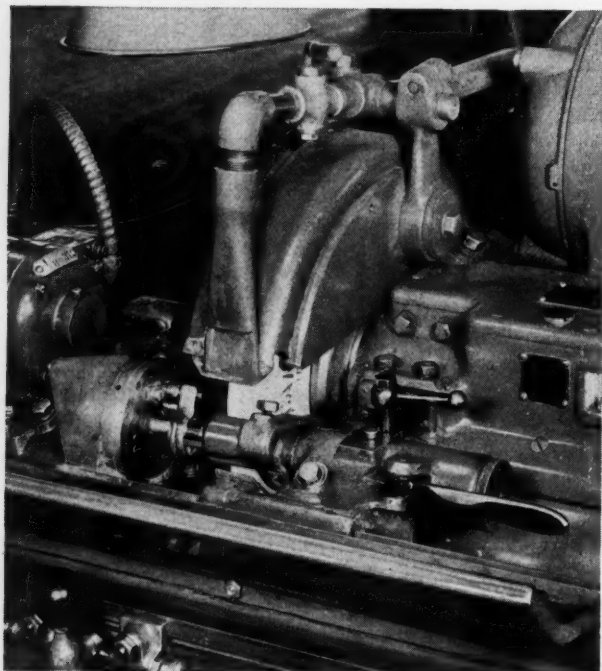
THE grinding and finishing of plug, ring, and go-and-no-go gages is precision work of the high-

est grade. Gages are usually required to be accurate to between 0.0005 inch and 0.00005 inch on the diameter.

0.00005 inch or less on roundness and straightness, and from 0.4 to 0.8 micro-inches root mean square in surface roughness.

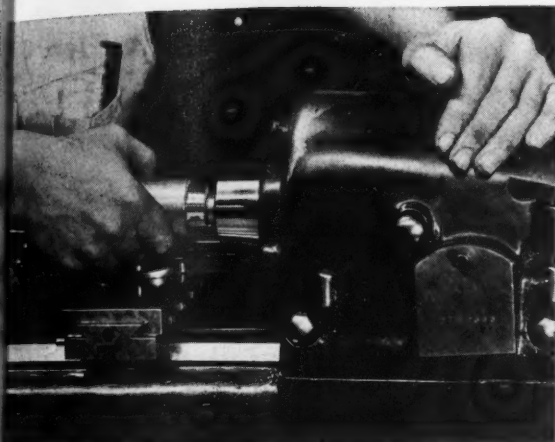
If the grinding machine that is to be used is in top notch condition, it will be possible to grind rough and finish ring gages to the required accuracy and surface quality without subsequent lapping. However, without lapping, the gages will not have the polish which seems necessary

gages to finish. The machine finish is good so concern finish. It is 0.005 in. plug gage to be lapped. grinding. In the good roundness obtained 150 gr oxide. special vi wheel. wheel, grou 0.0002 size. If the machine



Grinding a Gage, Using an Aluminum Oxide Wheel

Lapping a Plug Gage, Using a Cast Iron Lap and Carborundum "H 40 Coarse" Finishing Compound



is in mechanically fit condition, the required accuracy and surface perfection can be obtained by finish grinding the gage with a 320 grit special aluminum oxide special resinoid bond wheel. If, at the completion

of the operation, this wheel is allowed to "spark out," it will produce a good, long-wearing surface, but not of high luster.

If the grinding machine is not in sufficiently good condition so that it can be used to finish grind the plug gage to the accuracy and surface perfection required, it will be necessary to finish the gage by lapping. This operation can be performed with a split cast iron lap. The gage is chucked in a speed lathe and revolv-

gages that are made for the market. The matte finish produced by precision finish grinding is, actually, as good so far as surface qualities are concerned as a so-called "mirror" finish.

It is usual to leave from 0.001 to 0.005 inch of stock for finishing on plug gages made from steels that are to be hardened, nitrided, or chrome plated. This stock is removed by grinding after heat treating.

In the rough grinding operation, good results can be obtained by using a 150 grit aluminum oxide R grade special vitrified bond wheel. Using this wheel, the gage is ground to plus 0.0002 inch of finish size.

If the grinding machine to be used



Lapping a Plug Gage with a Resinoid-Bonded Hand Stone



Finishing a Plug Gage Using a Special Finish Which Allows the Gage to Rotate on Center While in Contact with Horizontal Aluminum Oxide Resinoid Disc

ed at a speed of approximately 800 surface feet per minute, during which the surface of the gage is moistened with a lapping compound consisting of 220 grit special aluminum oxide abrasive in a grease vehicle. The ring lap is then slipped over the end of the gage and is moved slowly back and forth longitudinally until the gage has been finished to the desired size and accuracy.

If it seems desirable to produce a still better finish, a second lapping operation is performed in the same manner as before, using a lapping compound of 1000 grit special aluminum oxide abrasive in a grease vehicle. If the rough grinding operation has been sufficiently well done to leave a smooth and comparatively accurate surface, the final finish may be obtained by lapping with a special aluminum oxide resinoid bonded hand stone of a size approximately 8 x 2 x 1 inch. The plug gage is revolved, during this process, at a speed of 200 to 300 revolutions per minute.

The stone is held against the gage at an angle to the axis and is moved back and forth over the work with a slight "sawing" motion while being moved laterally, in the same manner

as a lap is reciprocated. The pressure applied between the stone and the gage is about the same as would be applied in using a fine cut file. While the operation is in process, the

contacting surface of the work and the stone are kept moistened with a coolant made by dissolving approximately one pound of good soap chips in 20 gallons of water. This method of finishing plug gages is especially effective for tapered gages and is the method used by one of the largest gage manufacturers.

Another method of finishing plug gages, and one which is very effective when the production of any one size is not too great, is by the use of a horizontal aluminum oxide resinoid disc. For this operation the gage is mounted between centers in a special U-shaped holder so that the gage can rotate while it is being held by hand against the horizontal rotating disc, at an angle to the radial line of the disc. The greater the angle between the center line of the gage and the radial line of the disc, the more rapid will be the stock removal and the less the polish, although the surface will be just as good as one with a high polish.

This operation calls for a considerable amount of skill, for a taper may be produced by uneven stock removal due either to uneven pressure or the fact that the speed of cutting is in-

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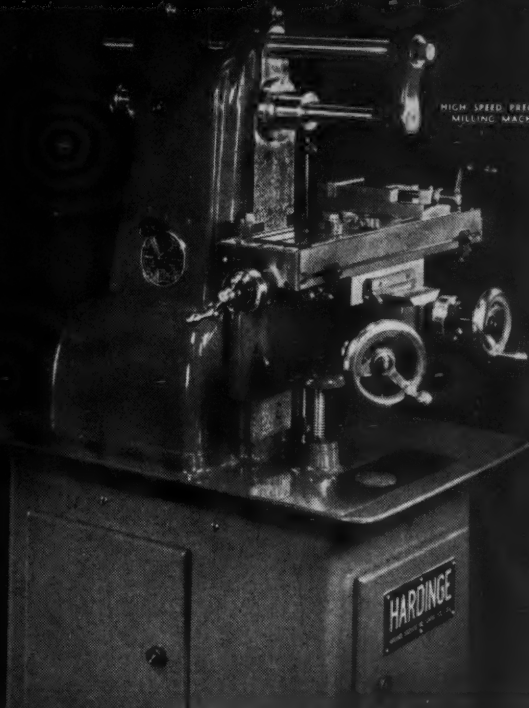
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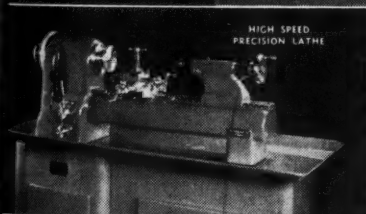
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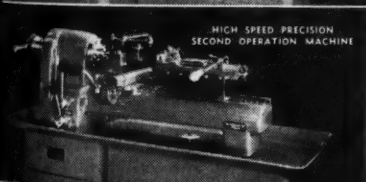
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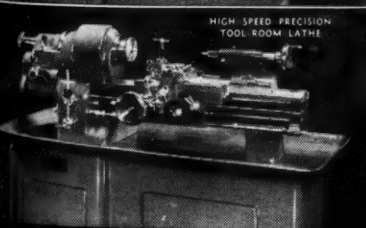
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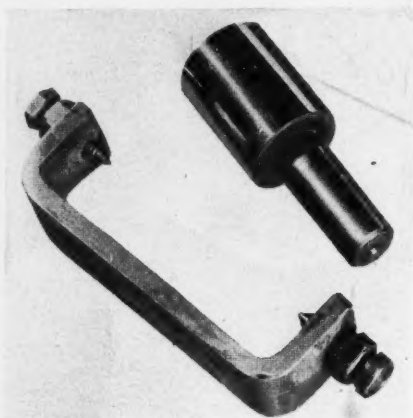
HARDINGE BROTHERS, INC.

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creased as the distance is increased from the center of the disc. Neither the stone nor the disc wheel method of finishing a plug gage will suffice when out-of-roundness or chatter marks are present in the gage. Such conditions can be corrected only by the use of the ring lap.

If a considerable number of plug gages of any one size are to be made, it is best to use a lapping machine



Fixture in Which Plug Gage is Held for Finishing on Horizontal Aluminum Oxide Resinoid Disc

either of the centerless or the flat plate type. Ring gages can satisfactorily be ground with the wheels usually used for internal grinding. However, the finish grinding operation can well be performed with a cubical grain aluminum oxide wheel of 220 grit, 12 grade cushioned resinoid bond.

As with plug gages, if out-of-roundness or chatter is present, the grinding operation must be followed by lapping with a revolving lap of cast iron, lead, or whitewood. Whitewood is very effective and accurate and often produces a better finish than can be produced with a metal lap. All of these laps are used with

a 220 grit aluminum oxide grease vehicle lapping compound.

The anvil faces of micrometer gages and go-and-no-go gages can be resurfaced with the side of a Type 1 aluminum oxide 220 grit resinoid bond wheel, 16 grade. This operation should be performed dry so that the operator can watch it closely.

As a rule, ground thread gages do not require much, if any, finishing. However, it is possible that even in ground thread gages faults will appear which must be removed. The best way to remove them is to cast a segment of lead against a perfect gage, and then run the segment against the imperfect gage with a moistening of 1000 grit aluminum oxide abrasive in a grease vehicle. This compound is suitable for teeth as fine as 32 per inch.

The thread of the gage moves the lap longitudinally. It is, of course, necessary to reverse the direction of revolution of the gage at intervals in order that the lap may act on both sides of the teeth profiles.

"For Power, Speed, and Control, Operate Hydraulically" is the title of a leatherette covered, loose-leaf catalog prepared for distribution by The Denison Engineering Co., Chestnut and Water Sts., Columbus, Ohio, covering the complete line of equipment marketed by this firm. The catalog includes bulletins containing illustrated, descriptive, and technical information on hydraulic presses (all types); hydraulic movement control equipment—hydraulic kiln and car propellers; automatic bar machines; hydraulic cylinders; hydraulic power units; hydraulic valves (all types); hydraulic pumps—variable volume, constant pressure; haulage systems; special mechanical and hydraulic machinery, and so on. Additional bulletins as published will be available for insertion in the catalog.

Copy of catalog will be sent free of charge to any managing executive or plant engineer addressing a request on his company letterhead.

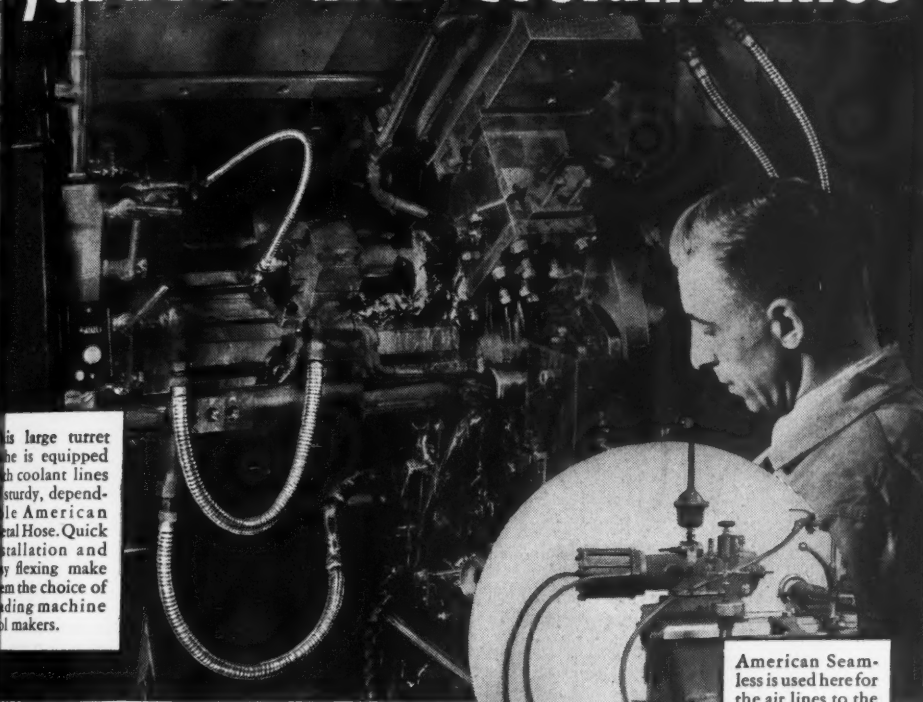
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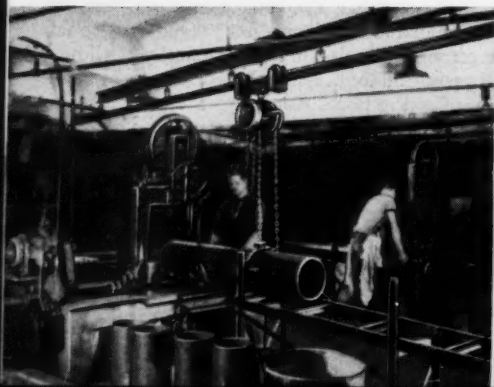
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April 30, 1803—President Jefferson signed the treaty purchasing the Louisiana Territory—and in one MINUTE extended the border of the United States from the Mississippi River to the Rocky Mountains.

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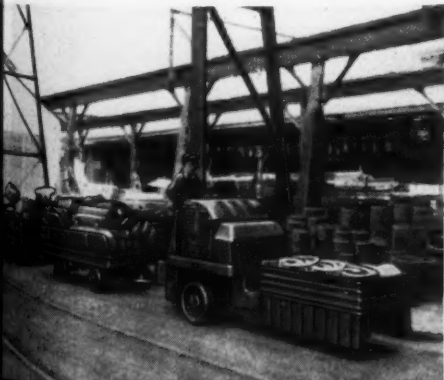
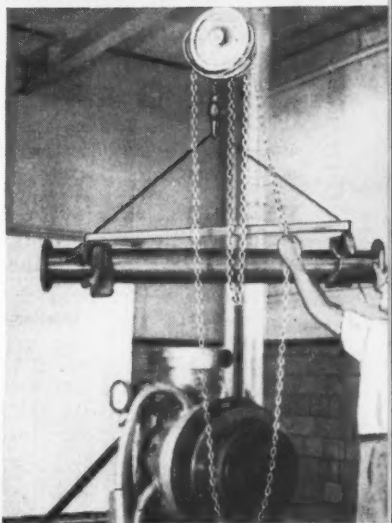
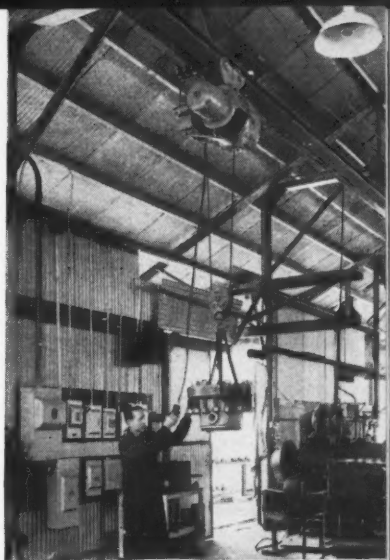
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Entrance to Offices of Merz Engineering Company, Indianapolis, Indiana

Merz Plant Is Example of Modern Design

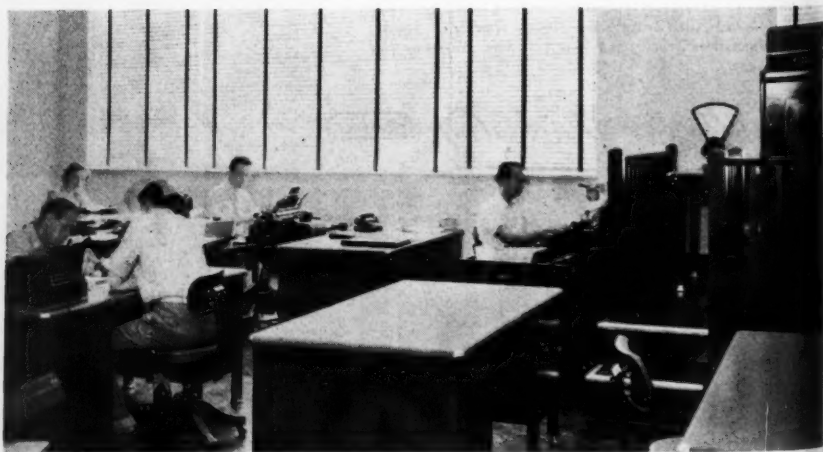
Planned for gage and tool manufacture, Merz planning includes the newest in lighting, air conditioning, and general plant equipment

By B. J. SMITH

General Manager, Merz Engineering Company, Indianapolis, Indiana

PLANNED to provide the utmost in facilities for its highly skilled workers, the utmost in the quality of its product, and the utmost in service to its customers, the new plant of the Merz Engineering Company at In-

Interior of Merz Engineering Company Offices



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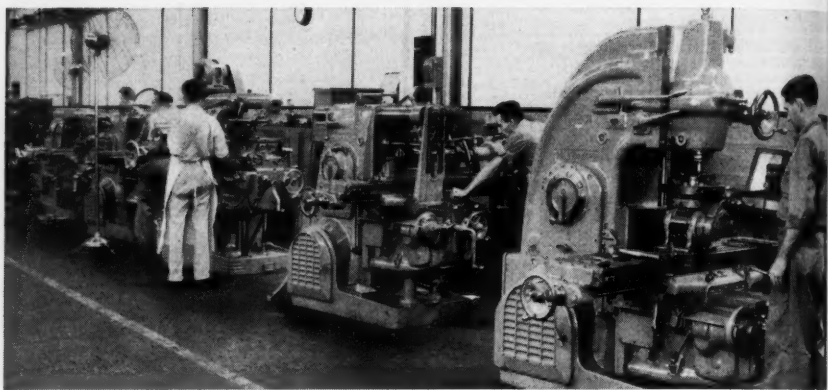
Engineering Department at Merz Engineering Company Plant

dianapolis, Indiana, is calculated to be the "last word" in modern tool and gage plant construction. The firm is at present engaged in the manufacture of A.G.D. gages, special machines, jigs, fixtures, and tools, all of which are urgently needed for the rapidly expanding National Defense Program.

The plant building is of brick and steel construction and comprises 36,000 square feet of floor space. Construction features include such items as glass brick for office windows, fluorescent lighting throughout the plant, air conditioning in the offices, gage manufacturing departments and inspection department, sound-absorb-

Heavy Machining Bay in Merz Plant





Line of Machine Tools Working on Jigs and Fixtures

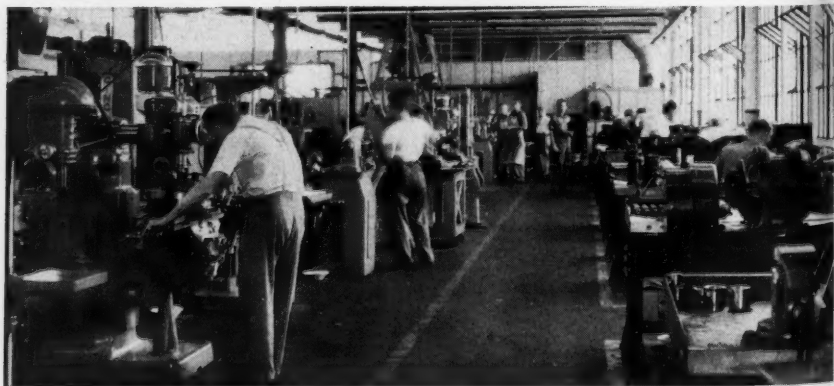
ent ceilings, and the newest in gage and tool manufacturing equipment. The plant employs some 400 workmen, practically all of whom are skilled craftsmen.

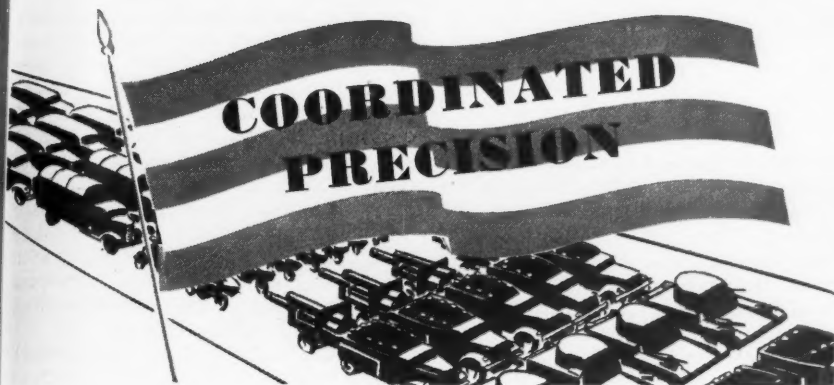
The Merz Engineering Company was founded in 1927 by Colonel Charles C. Merz to manufacture parts and engines for the aircraft industry. Later the company turned its attention to experimental engineering and designing, including the manufacture of special machine tools of unusual accuracy to meet special conditions. Through this channel the firm became involved in the manu-

facture of special tools and gages of a high quality, for which the demand has recently increased so fast that the new Merz Engineering plant, especially planned for the manufacture of gages designed to meet the high standards of modern manufacturing, was the natural result.

The new plant is more than just another factory. In reality it is a monument to the genius of a man who is still very much alive—Colonel Charles C. Merz. Known to almost every automotive, mechanical and electrical engineer in the United States, "Charlie" Merz has been one

Tool and Jig Department





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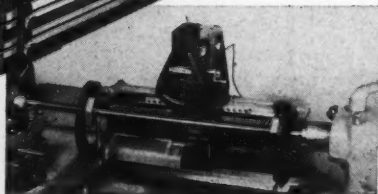
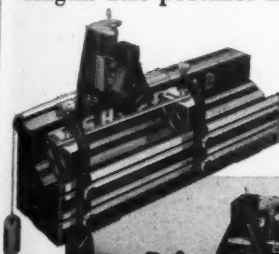


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The Sheffield Thread Lead Checking Instrument is the ultimate in accuracy and speed—checking with precision gage blocks as the reference. And no special skill is needed, for anyone familiar with inspection procedure can handle this instrument.

There are two models, one for use on the bench, and a portable model which may be used on work still in the thread cutting machine, without removal.

The bench model handles screws up to 6" in diameter and 30" in length. The portable model handles screws from 1" to 4½" in diameter or from 2" to 6". Twelve inches of screw is checked at one setting by either model. For screws longer than that more than one setting is made.



The principle of magnification is the well-known combination of Reed Mechanism and light beam lever, used in the Sheffield Visual Gage. The action of this mechanism is always positive, instantaneous and frictionless.

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man to whom they could turn for solution of many of their engineering and manufacturing problems where extreme accuracy and precision were absolutely essential.

The many unusual design features and details to be found in this plant were made possible by the close co-operation of the Merz staff with the builder. The plant floors are concrete throughout. In all production areas the concrete is covered with wood block and in all precision boring, grinding, finishing and inspection departments the floors are separate units, consisting of three and one-half feet thick monolithic concrete slabs isolated in heavy cork insulation, producing the effect of a "floating island," completely free from vibration.

The entire plant is fluorescent-lighted and the offices, en-

gineering, and precision production departments are completely air conditioned. Special efforts have been made to provide ideal working conditions for the man at the bench and the machine, as well as the girl at the desk or the man at the drafting board. Even the tints and textures of the walls and ceilings were chosen after exhaustive tests to select colors which would blend harmoniously with the characteristics of the fluorescent lighting so as to prevent distracting glare or fatiguing shadow.

The engineering department, which is air conditioned, is equipped with 16 drafting boards and the necessary

(Right) Row of Benches in Die Department. (Below) View in Precision Grinding Department. This Department is Especially Air Conditioned and is Lighted with Continuous Rows of Fluorescent Units which Deliver 50 Foot-candles of Light at the Machine



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FLEXIBLE SHAFT EQUIPMENT



Another View in Tool and Gage Grinding Department

tables, desks, files, chairs, and other equipment to handle the work of this department, all of which are of a standard design and green color. The room is lighted with continuous rows of fluorescent lighting units, set into troughs which extend crosswise of the ceiling so that the person who looks up casually from his drafting board or desk will not look directly at a light source.

In each one of these troughs deflectors are placed at regular intervals so that even if a person looks lengthwise of the trough, he will have to look practically straight upwards in order to see the lighting tube. This system of lighting breaks up the light and thus avoids glare. The worker at the drafting board or desk never has to look at the light tubes and thus highest degree of comfort is obtained for the eyes of the people in this department. The lighting equipment in this department is suf-

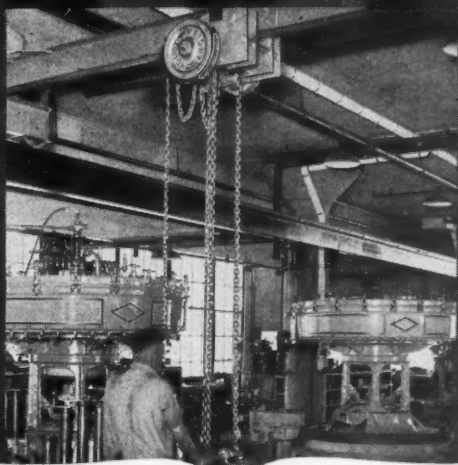
ficient to provide 50 footcandles of light at the drafting board.

In the shop the lights are suspended at a point 18 feet above the floor in the high bay and 12 feet above the floor in the low bay. Inasmuch as the machines in the high bay are of the large, heavy type, upon which the rougher machining operations are performed, the light obtained is ample for this work. In the low bay the light provided at the bench or machine is greater, which is necessary for the finer type of work done in this bay. Here the tool and diemakers have their benches, and here are located the lighter, more sensitive machines which are used by these artisans. In the grinding room, which is air conditioned, the lighting units are suspended at a point which affords approximately 50 footcandles of light at the machines, which is necessary for the precision work done on these machines.

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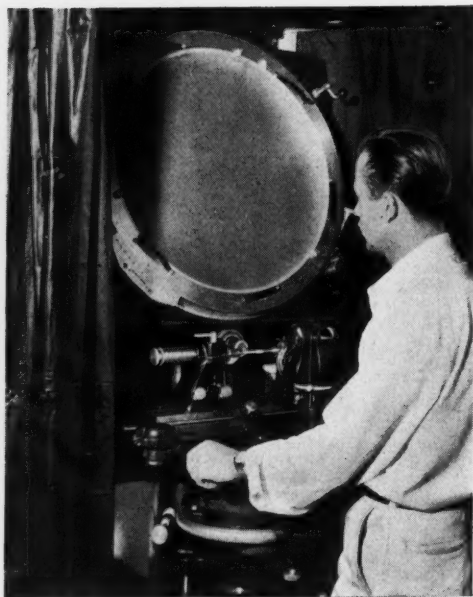
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J. & L. Comparator in Inspection Laboratory

tary surface grinder, Norton cylindrical grinder, Galmeyer & Livingston surface grinder, Abrasive surface grinder, Bryant hole grinder and four Brown & Sharpe surface grinders. The temperature in this room is maintained at 68 degrees.

The equipment of the jig boring room includes an American "Pacemaker" lathe, three Pratt & Whitney jig borers, an Elgin Hardinge bench lathe, Van Norman miller, Buffalo bench drill, and Knight vertical miller which is used for jig boring.

For the inspection laboratory, where the most accurate measurements must be made, an entirely independent air conditioning system has been installed

The equipment of the grinding room includes, among other machines, three Ex-Cell-O thread grinders, Moore jig grinder, Heald internal grinders, Landis cylindrical grinder, Thompson surface grinder, Heald ro-

tary surface grinder, Norton cylindrical grinder, Galmeyer & Livingston surface grinder, Abrasive surface grinder, Bryant hole grinder and four Brown & Sharpe surface grinders. The temperature in this room is maintained at 68 degrees. Humidity is maintained at an accurate 50 per cent, so that the room itself—for all practical purposes—is a giant

General View in Inspection Laboratory



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thermos bottle. The laboratory is equipped with testing instruments comparable in every respect to like instruments used by the Bureau of Standards at Washington, D. C., including a Jones & Lamson comparator, Pratt & Whitney measuring machine, Pratt & Whitney Super-micrometer, Gaertner Toolmakers' Microscope, Sheffield internal measuring machine, a large battery of Sheffield comparator gages, three working sets of precision gage blocks which are accurate to within four

millionths of an inch, and a special laboratory set of gage blocks calibrated by the Bureau of Standards which are accurate to within one millionth of an inch.

At the present time 20 per cent of the business of this company consists of special machine tools, 30 per cent is jigs, fixtures, and special tools, 30 per cent consists of gages, and the balance consists of high precision production on aircraft and ordnance parts.

J & L 35 MM. Slide Films and Lectures

To provide technical training schools and other institutions giving technical courses with material for instruction in inspection by optical projection and in automatic thread grinding, the Jones & Lamson Machine Co., Springfield, Vt., has prepared two slide films illustrating its optical comparators and automatic thread grinders. Each film is accompanied by a written description in lecture form that describes the use and application of these machines.

The optical comparator film shows numerous examples of the many objects inspected by optical projection of which a typical example is the inspection of the buttress threads of air-cooled airplane engine cylinders for lead and form.

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generators down to small fine pitch instrument gages.

The films can be projected with any standard 35 mm. slide film projector and either or both will be sent gratis to any university, technical school, or other institution providing technical courses upon request of the principal in charge.

Planer Limit Switches. Planer limit switches for the machine tool industry are described in a leaflet released by Westinghouse Electric & Mfg. Co. Application and construction of 2, 4, and 6-pole switches are discussed. The "quick make" and "quick break" mechanism of the switches, which consists of a horseshoe-shaped spring under compression, is described. Features of the switches are clearly shown by an illustrative "breakdown" of the essential parts.

A copy of Descriptive Data 15-075 may be obtained from Dept. 7-N-20, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pennsylvania.

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Tool — Barber-Colman Pinwedge Expansible Inserted Blade Reamer.

Part — Tractor first reduction gear.

Material — 3145 steel, 38-43 Rockwell hardness.

Operation — Reaming center hole 1.506"-1.508" dia. x 7/8" long.

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Holding — Three-jaw scroll chuck.

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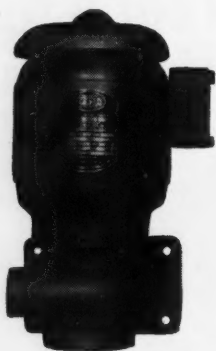


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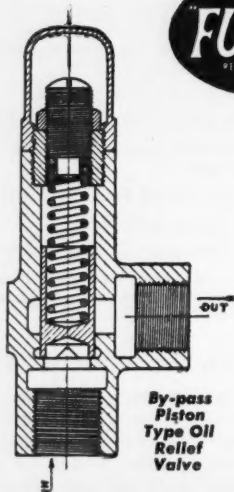
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Thread Grinding Applications, II

In this article, the last of three on the subject of thread grinding, the author discusses the different types of threads and the means used to produce them

By JOHN W. KING

Jones & Lamson Machine Company, Springfield, Vermont

THE wide range of work that can be handled by a single standard thread grinder, even without attachments, and the versatility of this machine, is one of the principal reasons for the important place that thread grinding has assumed in metal processing.

For example, thread grinders are

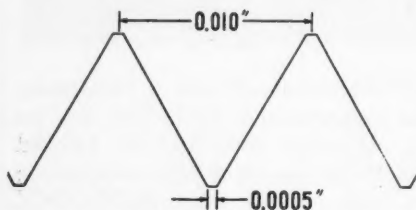


Fig. 1—Enlarged Outline of the Ground Thread Form of a 100-Pitch Thread Gage

now used to grind precision thread gages on a production basis. Such a gage is the one shown in Fig. 1, which was ground on the same machine which was shown in Fig. 1 of the second article of this series grinding a large worm.

When single point tools are used to cut threads, it is practically impossible for the operator to tell just how much the point of the tool is worn,

and such a tool will often wear considerably between the start and the finish of the thread. Thus the chance of obtaining sharp, well-formed thread roots is at best a gamble, particularly on fine-pitch threads. The automatic truing feature incorporated in the construction of the thread grinding machine provides the solution of this problem. Automatic truing keeps the wheel sharp and correctly formed, continuously. The wheel removes the metal by true cutting action, in the form of tiny chips instead of dust. Some of these chips, highly magnified, are shown in Fig. 2.

Many thread grinders are designed to provide automatically for one wheel truing for each thread ground, or two or more truiings for threads whose unwrapped length is unusually great. At first thought it might appear an extravagance for grinding wheels to be trued so often, but it is not. Ordinarily only 0.0005 inch or less is trued from the wheel. In such cases a thread grinding wheel has a life expectancy of more than 5,000 finished threads, which results in exceptionally low tool cost.

Automatic truing, coupled with automatic sizing, assures repeated accuracy; the tool does not have to be

For the Dust-Bowl Jobs— AIR or HIGH-CYCLE?

Foundries, for example. Dusty air is drawn through the tool. Dirt sometimes gets into exhaust ports, bearings and motor. Tools are often dropped in the sand. What would I recommend—Air or High-Cycle?

For the average foundry—Air. Because: (1) Air tools are about 2 to 6 lbs. lighter than corresponding High-Cycle tools—easier to handle—get more work out under average foundry conditions. Air is usually available anyhow. (2) Maintenance of air tools is simpler and easier for the average foundry repair shop.

When High-Cycle? (1) For lower first cost. (2) For lower power cost. (3) When proper care can be taken of the tools. (4) When you want to eliminate the dust-blowing caused by Air tools. (5) When you want quiet operation.

I'm unbiased. Perhaps modern Air tools should be used in *your* foundry or shop—or perhaps High-Cycle tools. It depends on your own problems. I can recommend either type to assure you tops in performance and satisfaction. Call me in. No obligation, of course.

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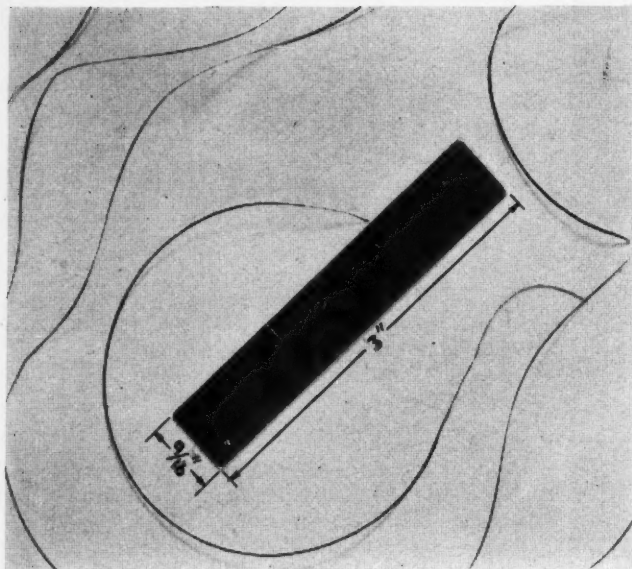


Fig. 2—Chips Produced by Thread Grinding Wheel

removed for sharpening, and it is not necessary, therefore, to re-establish size. Almost all conceivable thread forms can be ground; thread flanks may be symmetrical, buttress, straight-sided, or curved. The roots and crests may be vee-shaped, flat sloping, or curved, as necessary.

Various types of production jobs can be ground on a single thread grinder, including taps with interrupted threads, very small taps, the huge taps used on heavy machinery, and so on. Standard thread grinders and their standard attachments make it possible to grind nearly every conceivable type and size of threading job including worms, internal threads, hobs and taps (spiral fluted, relieved, interrupted, and so on), tap chasers, certain types of die chasers, tapered work, and so on.

More and more, manufacturers who formerly made their own thread grinding equipment for manufacturing their own products are using a standard thread grinder. Not only be-

cause such thread grinders produce more and better work than most specially-designed machines, but because standard thread grinders and the standard attachments are made on a production basis, making the cost much lower than the cost of specially designed equipment.

In Fig. 3 is shown a thread hob, without lead, that was ground on a standard thread grinder equipped with a standard hob-grinding attachment. The machine on which this hob was ground has a Geneva motion in the hob grinding attachment which automatically indexes the work for each annular thread.

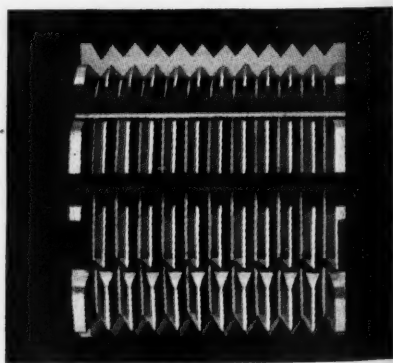


Fig. 3—Thread Hob, Without Lead, That was Ground on Standard Thread Grinder Equipped with Standard Hob-Grinding Attachment

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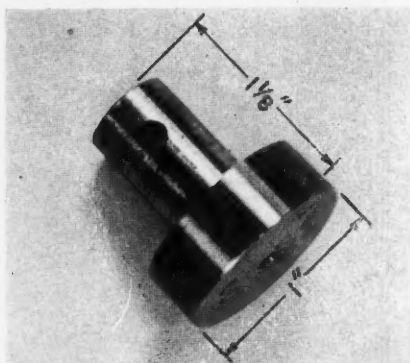


Fig. 4—The Ground Internal Threads of this Button Die are Relieved

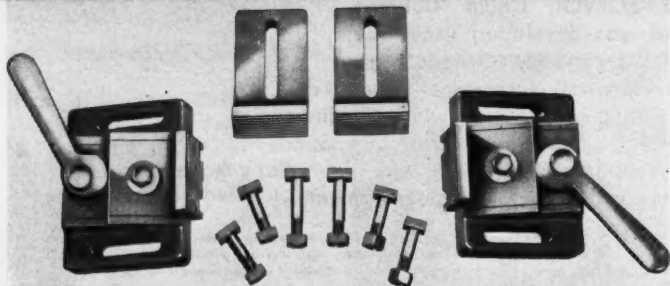
Small wheel and pencil wheel attachments are used for grinding the form on relieved hobs where a sufficient clearance cannot be obtained with standard large-diameter wheels. Hob tapping attachments for grinding and relieving the crests of hob

teeth are available which are required only in case the standard thread grinding wheel is too large to provide enough relief.

Internal thread grinding attachments have many interesting applications, such as for grinding tapered American Petroleum Institute threads for ring gages. Internal threads are ground with the same high precision as are external threads. Internal grinding attachments are quickly interchangeable with the external grinding wheel spindle. The button die shown in Fig. 4 is a good example of this type of work.

Different types of thread grinders employ different methods of grinding tapered threads. As mentioned in the previous articles of this series, one method involves the use of a hardened and ground steel former of the desired taper, which is bolted to the front of the workslide. The former controls the movement of the wheel spindle in such manner as to dupli-

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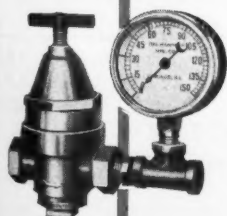
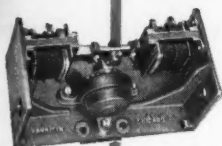
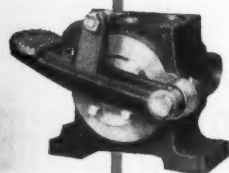
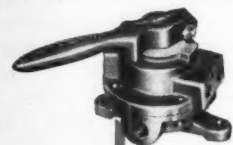
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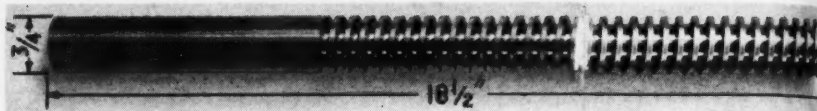


Fig. 5—Typical Precision-Ground Thread Lead Screw

cate the contour on the work, whether it is taper, a combination of straight and taper, double taper, or curved. No adjustment in the thread form is required when changing from straight to taper threads. On this type of grinder adjustment is also provided for grinding tapers of a few thousandths by means of a graduated screw which is employed to set the tailstock over.

A typical precision-ground thread lead screw that has been ground on a standard thread grinder is shown in Fig. 5. The screw is 5 pitch, Acme form, with an outside diameter of 0.750 inch and a threaded length of 15 inches. Machines with such pre-

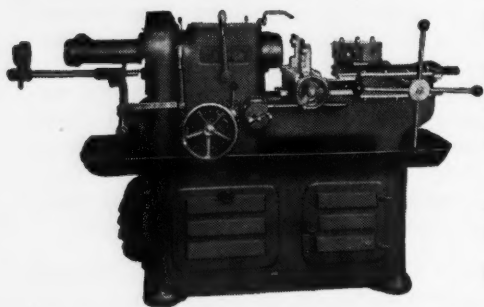
cision lead screws built into them do not require lead compensating mechanisms such as the type in which the lead screw is rotated by small increments one way or the other, or by means of a tailstock piece which is guided by the edge of an individually-profiled cam that has been designed according to the lead variation in the lead screw of the machine.

Thread grinders such as those presented in this article will produce thread angles within limits of accuracy of plus or minus 0.0002 inch with a cumulative error not to exceed 0.001 inch in 12 inches. Threads are automatically ground to a pitch diameter tolerance of 0.0005 inch.

MOREY No. 2G and No. 3 TURRET LATHES

Motor Drive

Infinite Spindle Speeds



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Speeds from: 90 to 1800 R.P.M.
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Capacity: 1" x 6 1/2" turning length

ASK FOR BULLETIN No. 629

No. 3

Speeds from: 60 to 2100 R.P.M.
or 100 to 3600 R.P.M.

Capacity: 1 1/2" x 9" turning length

ASK FOR BULLETIN No. 727

Any spindle speed you want—a direct reading dial shows when you've got it.
Permits the use of carbide tools for fast cutting.
Turret clamps and unclamps automatically.
Equally effective on second operation and chucking work.

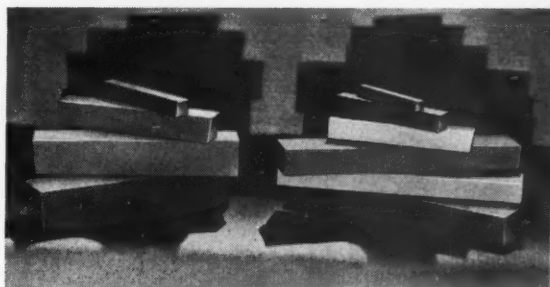
MOREY MACHINERY CO., Inc., 410 Broome St., New York, N. Y.

For Quick Delivery and Smaller Inventory Order Standard HAYNES STELLITE TOOL BITS

STANDARD Haynes Stellite tool bits are available for immediate delivery in a complete assortment of sizes—in both square and rectangular shapes. These solid bits can be readily converted to the various special cutting profiles required for different machining operations, so that any one size will serve for a wide variety of jobs. It is thus possible to hold your tool inventory at a minimum.

Also available for immediate delivery are Haynes Stellite standard welded tip tools and milling cutter blades.

Write today for full information.



Stocked for Immediate Delivery

Standard Star J-Metal and 2400-Metal tool bits are furnished finish ground with tolerances of plus 0.000 in., minus 0.005 in. on cross section, and plus or minus 1/8 in. on length. Sizes are listed below.

Standard Square Sizes, in.

3/16 sq. x 3	1/2 sq. x 4 1/2
1/4 sq. x 2 1/8	1/2 sq. x 5
1/4 sq. x 3	1/2 sq. x 6
5/16 sq. x 2 1/4	5/8 sq. x 3
5/16 sq. x 2 1/2	5/8 sq. x 3 1/2
5/16 sq. x 3	5/8 sq. x 4
3/8 sq. x 2	5/8 sq. x 4 1/2
3/8 sq. x 2 1/2	5/8 sq. x 5
3/8 sq. x 2 3/4	5/8 sq. x 6
3/8 sq. x 3	3/4 sq. x 3
3/8 sq. x 3 1/2	3/4 sq. x 3 1/2
3/8 sq. x 4	3/4 sq. x 4
3/8 sq. x 6	3/4 sq. x 4 1/2
7/16 sq. x 3	3/4 sq. x 5
7/16 sq. x 3 1/2	3/4 sq. x 5 1/2
1/2 sq. x 2 1/2	3/4 sq. x 6
1/2 sq. x 3	7/8 sq. x 5
1/2 sq. x 3 1/2	7/8 sq. x 6
1/2 sq. x 4	1 sq. x 5

Standard Rectangular Sizes, in.

3/16 x 3/4 x 4	3/8 x 1 x 4
1/4 x 5/16 x 1 1/2	3/8 x 1 x 4 1/2
1/4 x 3/8 x 2	1/2 x 5/8 x 3
1/4 x 3/8 x 6	1/2 x 5/8 x 4
1/4 x 1/2 x 4	1/2 x 5/8 x 5
1/4 x 1/2 x 6	1/2 x 3/4 x 3
1/4 x 3/4 x 6	1/2 x 3/4 x 4
5/16 x 1/2 x 3	1/2 x 3/4 x 5
5/16 x 1/2 x 6	1/2 x 3/4 x 6
5/16 x 5/8 x 4	1/2 x 1 x 3
5/16 x 3/4 x 6	1/2 x 1 x 4
5/16 x 1 x 4	1/2 x 1 x 5
5/16 x 1 x 6	1/2 x 1 x 6
3/8 x 1/2 x 2	5/8 x 3/4 x 3
3/8 x 1/2 x 3	5/8 x 3/4 x 4 1/2
3/8 x 1/2 x 4	5/8 x 3/4 x 5
3/8 x 1/2 x 6	5/8 x 3/4 x 6
3/8 x 5/8 x 3	5/8 x 1 x 4 1/2
3/8 x 5/8 x 4	5/8 x 1 x 6
3/8 x 3/4 x 3	5/8 x 1 1/4 x 4
3/8 x 3/4 x 6	5/8 x 1 1/4 x 6
3/8 x 3/4 x 4	3/4 x 1 x 5
3/8 x 1 x 3	3/4 x 1 x 6



The cutting ends of square bits are ground with a 7-deg. front clearance, and the gate ends of square and rectangular bits are notched so they will not be used for the cutting edge.

HAYNES STELLITE COMPANY

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New York, N. Y.

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Kokomo, Indiana

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Red-hard, wear-resisting alloys of cobalt, chromium and tungsten

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No one will regret buying quality that brings results on metal cutting jobs.

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Today our plant is at top speed, our men are in there fighting every obstacle, keeping the LENOX QUALITY at its peak.

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Springfield, Mass.



However, for gage or other extremely accurate work the pitch diameter tolerance can be held to much less than 0.0005 inch, the lead to much less than 0.001 inch per foot, and the angle to less than 2 minutes on the half angle.

In conclusion it should be noted that precision thread grinding has brought all the advantages of grinding to the threaded work and at the same time has provided for the threading of a large variety of jobs at a minimum of cost.

Hydraulic Drives. Complete information on hydraulic drives for all types of service is contained in a 24-page profusely illustrated bulletin released by the Hydraulic Division, Twin Disc Clutch Co., 1326 Racine St., Racine, Wis. Discussed in turn are: The Nature of Hydraulic Drives, Design and Performance of Hydraulic Clutches, Design and Performance of Hydraulic Torque Converters, Applications of Hydraulic Clutches, and Applications of Hydraulic Torque Converters. A summary is included in the back of the bulletin. Copy of Bulletin No. 132 free upon request.

"Grinding Carbide - Tipped Tools" Norton Company, Worcester, Mass., is now publishing a 64-page spiral bound handbook on reconditioning and sharpening single point cemented carbide tools entitled "Grinding Carbide-Tipped Tools." The handbook has been prepared with the object of assisting tool-room operators in selecting the proper grinding wheels and in employing the correct methods for sharpening these cemented carbide tools in order to obtain the most efficient and economical service from them.

The handbook is divided into four sections. Section I contains complete information on metal bonded diamond wheels for grinding cemented carbide tools; Section II, information on resinoid bonded diamond wheels, and Section III, information on green crystal wheels. Section IV is headed General Information.

Copy of handbook free to anyone addressing a request on his company letterhead.

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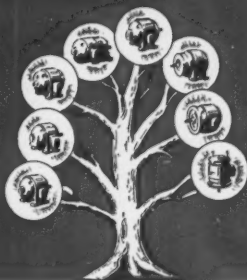
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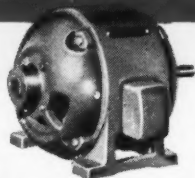
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is now a *family affair!*



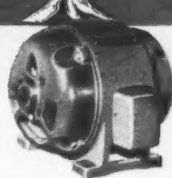
TRI-CLAD sleeve-bearing, polyphase industrial motor, which is the most widely used



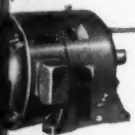
TRI-CLAD ball-bearing polyphase motor for use where end thrust is present



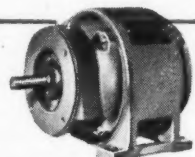
TRI-CLAD splash-proof, ball-bearing polyphase motor for use where wetness is a factor



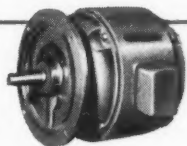
TRI-CLAD capacitor motor for single-phase operation of fans, pumps, compressors, etc.



TRI-CLAD gear-motor, economical, compact, low-speed for pinion drive



TRI-CLAD ball-bearing induction motor, with face-type end shield for direct coupling to machines



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TRI-CLAD vertical motor for general purpose fan, pump, and machine drives

Today

a wider range of your special needs can be filled by the growing Tri-Clad motor family. Every member offers extra strength and longer life because of these 3 "extras"

- *Extra Protection*
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AGAINST PHYSICAL DAMAGE. Cast-iron frame and end-shields.

AGAINST ELECTRICAL BREAKDOWN. Stator windings of Formex wire.

AGAINST OPERATING WEAR AND TEAR. New sleeve-bearing design.

Ask your G-E representative for information on Tri-Clad motor ratings and types now available.

Improvements in Tri-Clad motor design are fundamental improvements, not just "sales features" to glamorize a new model. That's why they are being introduced, month by month, to a whole family of G-E general-horsepower motors — both general-purpose and special types.

These new members of the Tri-Clad family are the result of basic redesign to meet modern industrial conditions. Each has new performance and convenience features important to its particular field of service. For complete information on the right Tri-Clad motor for your application, consult our local representative, or write General Electric, Schenectady, N. Y.

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GENERAL ELECTRIC



*in the Interest
of Defense...*

To get more Service fi

CONSERVATION of every basic defense material is now imperative. That is why we feel it is doubly important to list below the few simple rules which will enable you to get more service out of the grinding wheels you use. By making sure these rules are faithfully followed you will not only help your country conserve vital abrasive materials, but you will also at the same time speed up production, turn out better work and lower your costs!

1 MAKE SURE YOU ARE USING THE RIGHT WHEEL FOR EVERY JOB

• Standard Grinding Wheels are made to close tolerances of grit size, bond structure, grading, and consequently, performance. Given a definite grinding problem involving materials and machines of known characteristics, a wheel manufacturer can specify a wheel accurately fitted for the job. A wheel of exactly the right grain, grit, grade, bond, shape and size will last longer and do better work for less money. Let Carborundum help you choose the correct wheel for each grinding job.

2 MAKE SURE YOUR GRINDING SET-UP ON EVERY JOB IS RIGHT

• Manufacturers' recommendations should be carefully followed in the matter of wheel speed, proper coolant, wheel traverse, grinding pressures, etc. The correct balance of these factors makes it possible to realize the full advantage of properly specified wheels! Carborundum engineers will, if you desire, come into your plant, check your grinding conditions and point out the best methods for handling each job. Frequently they can recommend shortcuts that lead at once to higher production.

THE CARBORUNDUM C

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Service from your Grinding Wheels

3 MAKE SURE EACH GRINDING WHEEL IS CORRECTLY MOUNTED

• Another extremely important factor in grinding wheel life and operation is the mounting of the wheel. This must be carefully and painstakingly done to make sure the wheel is in perfect balance and runs true. If your operators have difficulty doing this, The Carborundum Company will be glad to send you detailed instructions covering the proper procedure for mounting a grinding wheel. Or if you prefer, a Carborundum representative will call and personally instruct your operator.

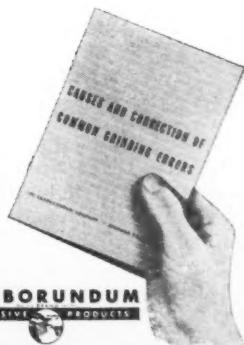
4 MAKE SURE EACH GRINDING MACHINE IS IN GOOD CONDITION

• The right wheel, the correct set-up and proper mounting are still not enough to insure long wheel life if the grinding machine itself is not in good condition. Bearings should be snug, foundations firm, and every care taken to make sure the machine is as free from vibration as possible. The frequent inspections and careful servicing necessary to maintain each grinding machine in tiptop condition will be paid for many times in longer wheel life, better work, and higher production.



WRITE FOR FREE BOOKLET!

Many of the causes of shortened wheel life, below-par workmanship and lowered production are simple and can be eliminated quickly by your own operators. You are cordially invited to write for a free copy of "Causes and Correction of Common Grinding Errors." It is packed full of information that will help you get more service from your grinding wheels and step up the efficiency of each grinding operation. Write today!



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Philadelphia Convention Hall and Commercial Museum

Twenty-third Annual Metal Congress and Exposition

*to be Held in Philadelphia
Week of October 20*

NATIONAL DEFENSE and its bearing on the industrial situation today will be the most important topic coming up for discussion at the 23rd Annual Metal Congress and Exposition to be held in Philadelphia the week of October 20th. The Metal Congress and Exposition is sponsored

by the American Society for Metals with the cooperation of the Wire Association, the American Welding Society, and the Institute of Metals Division and the Iron and Steel Division of the American Institute of Mining and Metallurgical Engineers. A session has been arranged by W.



What do You NEED in AIR CONTROLS?

DEPENDABILITY?

Ross Valves are today giving day-in-and-day-out performance—without delays or shut-downs—in hundreds of diversified plants.

EASY INSTALLATION?

Ross Valves, with all ports on one face, can be mounted anywhere, in minimum time. And if occasion requires, can be and are changed in three minutes' time.

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Ross Valves control a welding operation which produces 400 welds a minute—more than $6\frac{1}{2}$ per second.

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Ross Valves, made fifteen years ago for heavy duty Steel Mill work, are still in active and satisfactory operation.

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Ross heavy-duty valves, produced after many years of air control experience, provide an extra-wide margin of strength for the unusually tough job.

SOME SPECIAL PROBLEM?

The Ross Engineering Staff—and Ross mechanics—have for long years specialized on the design and production of Air Control Valves only—and they are experts at that job. . . . If you have some specially difficult or specially intricate problem of air control, Ross technicians will solve it for you.

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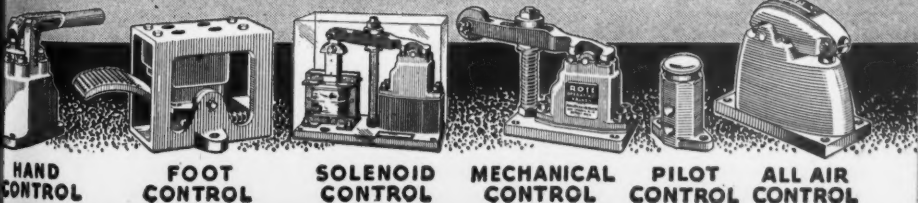
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BRIDLE FOR AIR HORSEPOWER

SIZE AND TYPE FOR EVERY OPERATION



HAND
CONTROL

FOOT
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SOLENOID
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MECHANICAL
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PILOT
CONTROL

ALL AIR
CONTROL

H. Eisenman, Managing Director of the Congress and Secretary of the A.S.M., at which some of the important men of the defense program will be present to discuss the metal situation with the armament producers.

A very comprehensive program has been arranged for the technical sessions of the Society, which will be held at the Benjamin Franklin Hotel. Papers will cover subjects dealing with steel production, machining and working of forgings, castings, and steel sheets, and — of course — many topics bearing upon metallurgical science and practices.

It is intended that the Congress will afford an opportunity for manufacturers to study new methods and equipment for speeding defense preparations. Each morning during the week of the Congress one of the government's leading executives in the defense drive will address the Metal Congress on defense progress and the requirements in Army, Navy, aircraft and civilian production. During the afternoon and evening sessions of the Congress, round table discussions on the most important phases of armament production will be headed by armament manufacturing experts.

The Exposition, which each year attracts many thousands of persons connected with the metal industry, will be held in Philadelphia's Commercial Museum and Convention Halls. With the total cooperation of the government assured, it is predicted that the Congress will be the largest ever staged. Further indication of the fact is seen in the advance sales of exhibition space. With the "go ahead" signal flashed to them by the government, most industrial concerns are contracting for larger exhibit space this year than they have used previously. In one case, accord-

ing to Mr. Eisenman, the increase as much as 360 per cent. Attendance, too, is likely to reach a new high according to officials of the A.S.M. They say that from all indications the attendance will be well in excess of the 50,000 persons who attended the Cleveland show last year.

Among the topics to be covered at the convention are (1) "The Manufacture of Shells," (2) "The Molybdenum High Speed Steel," (3) "Tool Steels," (4) "Magnesium for Aircraft and Other Defense Equipment," (5) "Aluminum," (6) "Copper," (7) "Bearing Metals." There will also be discussions on pig iron, scrap, and priorities.

There will also be a series of talks on the conservation of and substitutions for alloyed metals under the following classifications: (a) Case Hardening, (b) Deep Hardening Steels, (c) High Strength Structural and Weldable Steels, (d) Alloy Castings, (e) Stainless and Heat Resisting Steels.

The program for the American Welding Society, which will hold its sessions at the Bellevue-Stratford Hotel, will include discussions bearing on weldability of various types of steels and non-ferrous metals, the technique involved in shipbuilding welding as applied to railway locomotive and car work, welding in the aircraft and automotive industries, piping, machinery, and the training of welding operators. The Wire Association and American Institute of Mining and Metallurgical Engineers will also have well rounded-out programs.

The publishers and editors of MODERN MACHINE SHOP will be glad to greet their friends and readers in Booth No. F-57 at the Metal Show.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ *in* **ANY PLANE** ★

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IDEAS FROM READERS

Shaper Work Holding Fixture

By ARTHUR HAVENS

AMONG the numerous difficult shaper jobs encountered is the machining of valve crossheads. Due to their shape, the crossheads are awkward to hold, and, in addition, they must be planed on three sides. The fixture shown in the illustration

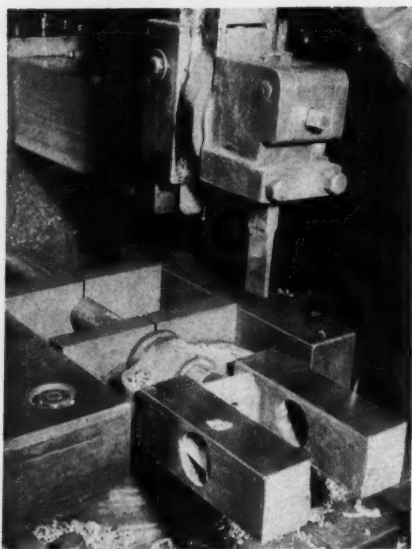


Illustration Showing Design of Shaper Work-Holding Fixture

herewith is designed to hold work pieces of this type easily and firmly for machining as well as to speed up operation.

To make, a 2-ft. length of bar stock is turned to an equal diameter the entire length with the exception of one end. This end is turned to a taper which corresponds with the taper on the inside of the crosshead or part to be machined. A short stud is left on the end of the taper and is threaded to take the largest nut possible.

Two pieces of flat stock are now planed in such a manner that when finished they will be approximately $1\frac{1}{4} \times 10 \times 4$ in. in size. These rectangular blocks are drilled through the exact center and then bored to the same diameter as the bar of the fixture. Following this operation each block is sawed into two pieces by using a cutter of about $\frac{3}{16}$ in. in thickness, cutting through the exact center of the hole.

When the crosshead is driven onto the taper of the fixture bar and the nut tightened, the bar is slipped through the blocks, which have been laid loosely in the shaper chuck. A slight pressure is applied to the blocks to hold the bar firmly but still loose enough so that it can be moved easily. The crosshead is centered with a surface gage and when true the jaws of the chuck are tightened thereby holding the part firmly to

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October, 194



At the Craine-Schrage Steel Company, as in modern plants everywhere, you'll find the

Hack Saws are *MARVELS*

Add this Detroit plant to the long list of leading steel companies, forge shops and industrials that have standardized on MARVEL Metal-sawing Equipment. In this plant you will find: a MARVEL No. 18 Saw, MARVEL No. 9A and No. 6A Heavy-duty High Speed Saws, and a MARVEL No. 8 Band Saw. So it is in modern plants in all parts of the country — MARVEL Sawing Machines predominate.

Whatever your metal sawing problem, whether cutting-off from bar stock or large billets, there are MARVEL Saws exactly suited to your needs. Your local MARVEL Sawing Engineer will gladly study your metal-cutting problems and recommend the most suitable methods and equipment to speed up your production.

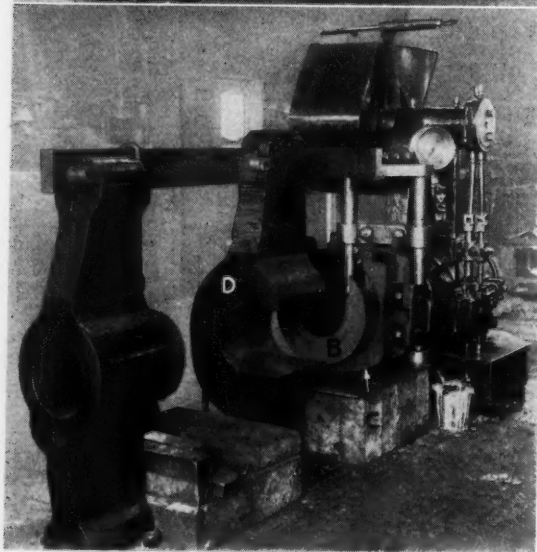
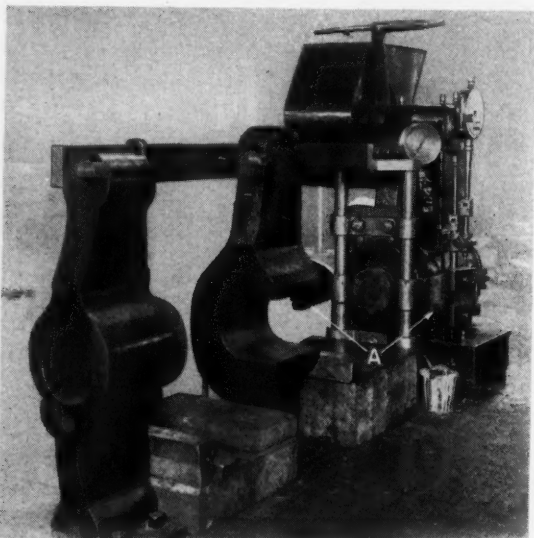
ARMSTRONG-BLUM MFG. CO., "The Hack Saw People"
5700 Bloomingdale Ave., Chicago, U. S. A. Eastern Sales: 225 Lafayette St., N. Y.



planing the top and sides.

When the first planing operation has been completed, the jaws are loosened a little and the crosshead is rotated a half turn in the blocks. Checking the centers with the sur-

face gage assures the operator that the part is perfectly square, thereby enabling him to continue with the shaping operation.



Attachment for Use in Removing Crown Brass from Locomotive Driving Box

By L. S. TAYLOR

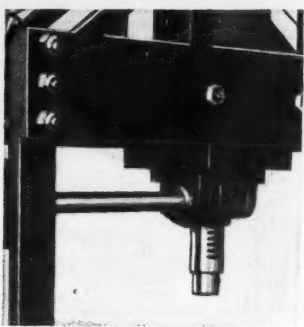
THE illustrations show a hydraulic press with attachment for use in removing the crown brass from locomotive driving boxes. The attachment consists of two hooks, designated as A, which swing on upright shafts fastened to the press in such a manner as to firmly hold the hooks and withstand the pressure required to remove the crown brass from a driving box.

When removing a driving box crown brass, such as shown at B, the hooks A are swung around until they close in on the inside of the flange of the driving box, which is designated as C. Ample space is provided between the box and the center support D to enable the brass to be pressed

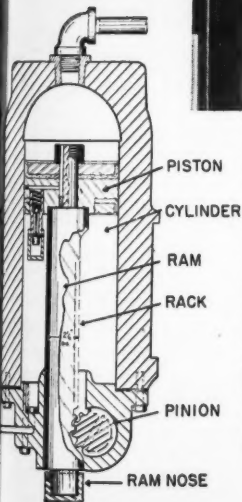
(Above) Attachment arranged to receive locomotive driving box
(Below) Attachment being used to hold driving box while crown brass is removed.



EVERY KRW HYDRAULIC PRESS HAS A "BUILT-IN" MECHANICAL ARBOR PRESS WITH 3 TON CAPACITY



Above: Rear view showing rack and pinion mechanism controlled by "Capstan" type hand-wheel.

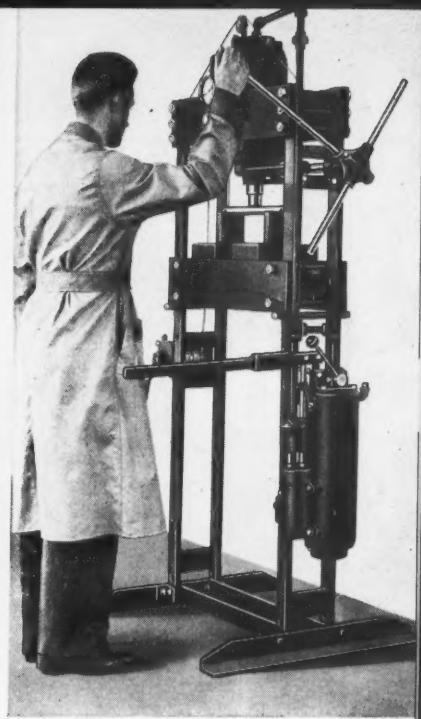


A 3-ton Mechanical Arbor Press is built into every KRW Hydraulic Press. It operates the ram mechanically and gives you the advantage of the large press bed and its adjusting mechanism.

The downward motion of the ram when operated by the "Capstan" type handwheel automatically fills the hydraulic cylinder with oil. Thus, if an operator starts to press an apparently light job by the rack and pinion mechanism and finds he cannot obtain enough pressure, he simply swings the ball arm to close the valve and continues the operation with the hydraulic pump handle without moving the work from its original location.

KRW Presses are built in 25, 50 and 75 ton sizes. Prices start as low as \$198.00. Mail the coupon for your copy of the New KRW Press Bulletin. Compare before you buy.

2 PRESSES IN 1 at No Extra Cost



Above: Showing use of Mechanical Arbor Press to straighten bar supported on KRW All-Steel V Blocks. Note sliding handle in "Capstan" type handwheel is extended for increased leverage.

K. R. WILSON

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A sturdy gage for production yet accurate for highest precision. Five sizes cover a range from 1" to 12" diameter. Reading to .0001". Selfcentering in bore.

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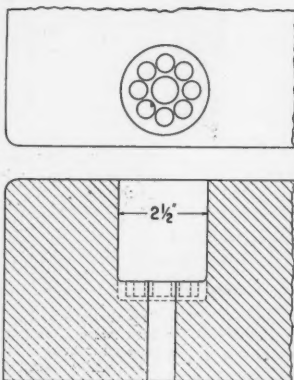
the way out of the box. Such space is necessary, since many times the outside diameter of the brass is larger than the opening in the center support.

In replacing the crown brass into the driving box, the hooks are swung around out of the way and the box placed against the center support in such a manner that the brass can be pressed into position by means of the ram of the press.

Method of Facilitating Scale Removal

By PETER L. BUDWITZ

IN the production of heavy parts made from steel castings an engineering change necessitated an increase in the depth of a cored hole



Drawing Illustrating Method of Breaking Scale in Bottom of Cored Hole

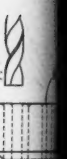
indicated by the dotted line in the cross section view in the accompanying drawing.

An attempt was made to remove some of the stock from the bottom of the holes by using a two-lipped high speed steel counterbore of the proper diameter piloted by the smaller center hole. Much difficulty was

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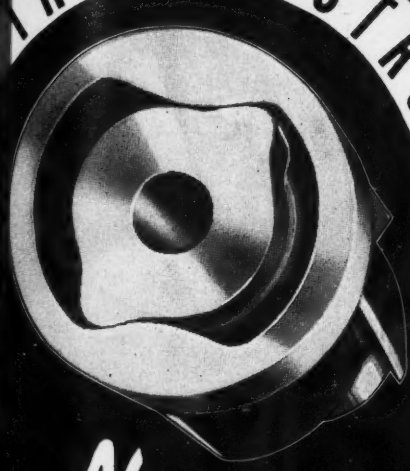
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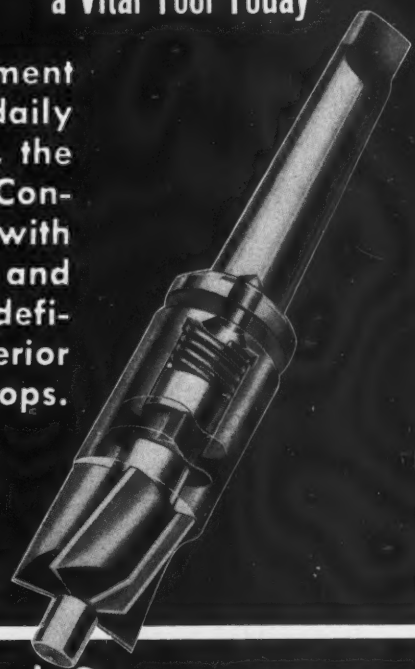
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THE INDESTRUCTIBLE DRIVE



This Exclusive Feature
Makes Continental Counterbore
a Vital Tool Today

NOW that the replacement of perishable tools is daily becoming more difficult, the lasting qualities of the Continental Counterbore . . . with its indestructible drive and interchangeability . . . is definitely proving its superior value in thousands of shops.



CONTINENTAL
Interchangeable
COUNTERBORE

Continental Tool Division
X-CELL-O CORPORATION
Detroit (XLO) Mich.

Longer life for CARBIDE TIPPED TOOLS



with this wet or dry
STANDARD GRINDER

This substantial precision grinder provides great economy by removing less metal from carbide tipped tools and gives keener edges in less time.

While each wheel is equipped with wet grinding attachment, a separate toggle switch operates motor driven pump permitting dry grinding. Drum reversing switch included. Manufactured in three sizes: 1 HP for 10" wheels; 2 HP 12", both with 1750 RPM motor; 3 HP 14" with 1150 RPM motor. These grinders use either cup or steel back cylindrical wheels.

Write for Catalog 43.

The **STANDARD ELECTRICAL TOOL Co.**

BURNS and 8TH ST.

CINCINNATI - OHIO

encountered, however, in trying to get under the steel scale, resulting in rapid wear on the cutting edges of the tool.

To overcome the difficulty, a simple drill guide insert containing a series of holes as shown at A was made and used to guide a smaller drill upon which the cutting edges had been ground flat. With these tools a series of holes was drilled around the bottom of the cored opening, which procedure aided greatly in breaking up the hard surface of the casting. The large counterbore was then used to finish the holes to the required depth.

After the first hole in each series had been drilled, a plug was inserted through the jig into the drilled hole, thus preventing the jig from revolving while the rest of the holes were being drilled.

Does Pulley Crown Cause Belt Slip?

By W. F. SCHAPHORST

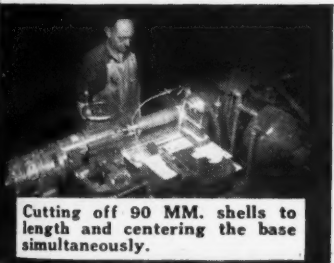
MANY machine operators erroneously believe that there is more belt slip on a crowned pulley than on an uncrowned pulley. The idea seems to prevail that slip varies proportionately with the crown due to the fact that most pulley wear occurs on the crown itself. The greater the crown the greater the wear on the "peak" of the crown. It is argued that since the peak of the crown is farther away from the center of the shaft than is the edge of the pulley, the velocity of the center of the belt is greater than the velocity of the edge of the belt and therefore, due to this difference of velocity, there must be some slip to "adjust things."

Such reasoning is not correct. There is no belt slip on a pulley due to adjustment of the belt to fit the crown. The reason why the crown wears down quickly under severe

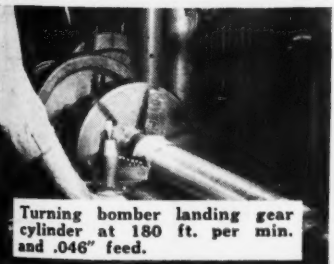
KENNAMETAL ★ STEEL CUTTING ★ CARBIDE TOOLS



Turning Garand rifle barrels in a Fay-Automatic with four KENNAMETAL tools.



Cutting off 90 MM. shells to length and centering the base simultaneously.



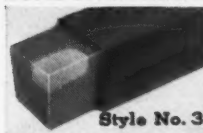
Turning bomber landing gear cylinder at 180 ft. per min. and .046" feed.

Save thousands of man hours on defense jobs everywhere . . .

In gun factories, in shipyards, in Government arsenals, in airplane plants . . . virtually everywhere that steel is being machined for National Defense, you will find KENNAMETAL carbide tools on the job. Because of its faster cutting speeds, KENNAMETAL increases the production of both men and machines from 30 to 50% . . . saving thousands of man hours urgently needed in the Defense effort.

Despite the tremendous demand for KENNAMETAL, shipments of Standard and Modified Standard tools are made within 10 days of receipt of orders; standard tool tips within 3 to 4 days. Some Standard KENNAMETAL tools (supplied in grade KM only) are now carried in stock for immediate delivery. Write for weekly stock list.

SOME STANDARD KENNAMETAL TOOLS



Style No. 3



Style No. 11

McKENNA METALS Co.

300 LLOYD AVE., LATROBE, PENNA.

FOREIGN REPRESENTATIVES U.S. STEEL EXPORT CO.
Exclusive of Canada, Great Britain and Possessions

Visit the KENNAMETAL Exhibit at Booth D-55, National Metal Congress and Exposition.

conditions is that the pressure per square inch is greatest on the largest diameter. Therefore, if the belt slips, the crown receives most of the abuse. Slip, of course, is greatest on the crown, but the higher pressure is the principal cause of the wear.

A prominent engineer in a lecture declared that due to crown and the difference in velocity at the edge and center there must be some corrective slip. The best way in which to disprove this theory is to consider a thick V-belt as it travels around a sheave. The inside moves at a slower velocity than the outside, yet there is no slip on the sheave due solely to this difference in velocity. An adjustment in belt length is made the instant the belt is wrapped on the sheave and again the instant the belt leaves the sheave. The outside stretches and the inside compresses. This is similarly true with flat belts. The instant the flat belt curves onto

the pulley it adjusts itself to the surface without slipping. The sides of the belt shorten, and the center stretches slightly. Of course, there is slip on the pulley face but this is caused by creep and not at all by the fact that the pulley is crowned.

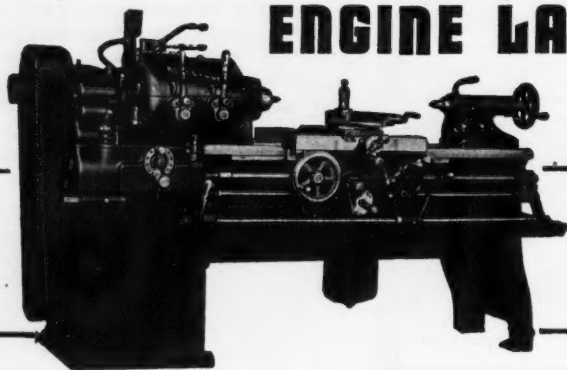
Graduations on Lathe Chuck Speed Chucking

By W. H. NOSTELL

THE drawing shows how a lathe chuck can be graduated to speed up chucking. To mark the chuck in this manner, a true round piece of work of about average size is firmly chucked to run true with an indicator. Each chuck screw is then marked by a scratch near its edge approximately on the jaw center line, and equally spaced graduations are made around the screw on the chuck

BOYÉ & EMMES

ENGINE LATHES



THE BOYÉ & EMMES MACHINE TOOL CO.
C I N C I N N A T I O H I O



Speed Up

**GEAR
CHECKING
WITH**

RED RING UNIVERSAL GEAR TESTER AND LEAD COMPARATOR

Red Ring Universal Gear Testers will check index, interference, helix angle, wobble, eccentricity and tooth size of the ordinary small gear in less than a minute, making it useful for production inspection.

Operation is simple, easy—requires no extraordinary skill. Readings are to .0001".

The Red Ring Helical Gear Lead Comparator compares the lead of each tooth to that of a precision master gear, or to a master disc. Set up is simple and easy, and once the job is set up almost any workman of average skill can make the inspections.

Gears integral with the shaft—arbor mounted gears—or internal gears may be checked.

Both gear testing machines are extremely sturdy, high precision instruments. They will make a large reduction in gear inspection time and cost.

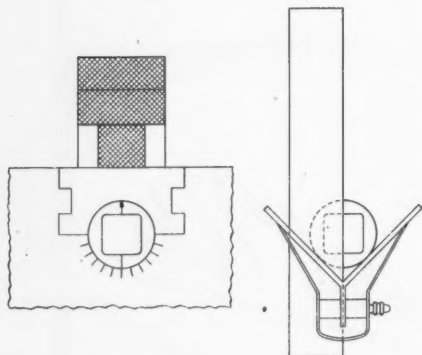
Write for data on these and other Red Ring Machines.

NATIONAL BROACH & MACHINE CO.

5600 ST. JEAN

DETROIT, MICHIGAN

body. The chuck screws may be removed and replaced one at a time to produce the mark across the end of



Drawing Showing How Lathe Chuck Can Be Graduated to Speed up Chucking

the screw through its center line, as shown at the right. The end of the line drawn should be identified by an

arrow head or otherwise to avoid confusion.

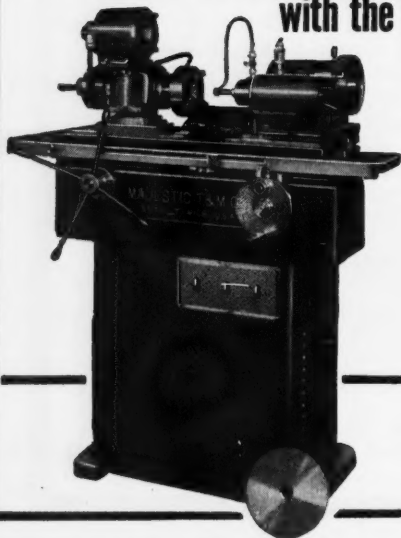
The graduations will now be of great assistance in chucking work to run true regardless of the size of the work. After roughly truing up work in the usual way, reference is made to the chuck graduations and the chucking operation is completed without the use of a piece of chalk, reference to tool, and so on. After being marked in this manner, the chuck screws should not be changed around.

Quick Methods for Halving and Doubling Odd Numbers and Fractions

By E. W. DAUM

IN the article herewith, the writer describes several short cuts for halving and doubling odd numbers

SIMPLIFIED INTERNAL GRINDING with the MAJESTIC INTERNAL GRINDER



An exceptionally wide range of internal grinding jobs can be handled on the New Majestic Internal Grinder. Its simplicity of design and ease of operation are features of utmost importance in providing maximum grinding output at low cost.

SPECIFICATIONS

Length of table, 48". Swing over table, 10". Travel of cross slide, $2\frac{1}{4}$ ". Precision dial graduated to .0001". Precision bearing work head. Speeds — 100, 225, 350 r.p.m.

Write for complete details contained in New Bulletin

Majestic Tool & Mfg. Co.
2950 E. Woodbridge Detroit, Mich.

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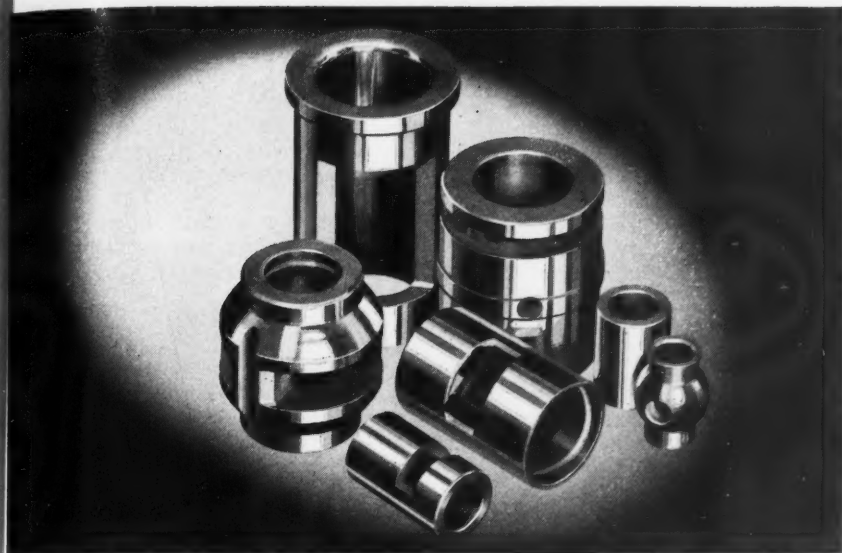
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QUALITY *is determined* by PERFORMANCE

New Catalogue

Just issued, lists and describes the most complete sleeve bearing service in the world. It's Free.

At no other time, in the history of our country, has it been so important to insist on **QUALITY**. The present continuous and uninterrupted operating schedules are placing unusual burdens on all types of machinery. Few items in your equipment carry such responsibility as the bearings. One faulty bearing can easily hold up an entire line of production. This is no time to experiment with unknown, untried, unproven products.

It is a simple matter to eliminate all risk when securing bearings. Specify **JOHNSON BRONZE**. For more than thirty years we have specialized on the production of **QUALITY Sleeve bearings**. Our experiences cover every known type . . . our facilities include every proven method.

The next time you purchase bearings, don't base your judgment on price alone. Check up on the alloy, the method of production, the experience and reputation of the manufacturer. Play safe and specify **JOHNSON BRONZE**.



JOHNSON BRONZE

Sleeve BEARING HEADQUARTERS

590 S. MILL STREET · NEW CASTLE, PA.

October, 1941

MODERN MACHINE SHOP 157

and fractions and also for dividing numbers of this kind into three parts and tripling.

Take, for instance, the halving of the mixed number $9\frac{7}{16}$. One-half of 9 equals 4. Adding the numerator 7 to the denominator 16 equals 23, which will be the numerator of the answer. The denominator will be 16 doubled, which is 32. Thus, the answer is $4\frac{23}{32}$.

To double the odd number $4\frac{23}{32}$, the procedure herewith is followed: The denominator of the answer will be $\frac{1}{2}$ of the denominator of the fraction to be doubled, which in this case is $\frac{1}{2}$ of 32 or 16. Dividing this denominator into the numerator 23 gives $1\frac{7}{16}$. The 7 will be the numerator of the answer. Doubling the digit 4 gives 8 and adding the digit 1 of the fraction $1\frac{7}{16}$ gives 9; hence, the answer is $9\frac{7}{16}$.

Our next example is to divide the mixed number $10\frac{5}{16}$ into three parts.

One-third of 10 equals 3, which will be the digit of the answer. Adding the numerator 5 and the denominator 16, we get 21, which is the numerator of the answer. Multiplying the denominator 16 by 3 gives 48 and the denominator of the answer. Thus, the result of $10\frac{5}{16}$ divided by 3 is $3\frac{21}{48}$ or $3\frac{7}{16}$.

To triple a mixed number such as $3\frac{7}{16}$, multiply the number 7 by 3 and divide by 16, giving $1\frac{5}{16}$. Multiply the digit 3 by 3 (9) and add $1\frac{5}{16}$, which gives the answer $10\frac{5}{16}$.

The above method for dividing a mixed number or a fraction by 3 holds good only for numbers whose digits have $\frac{1}{2}$ left over, as in the example above. Suppose the number was $11\frac{7}{16}$ instead of $10\frac{5}{16}$. To divide this number in three parts, divide the 11 by 3, which equals 3 and $\frac{2}{3}$ left over. To get the numerator of the answer, double the denominator 16 and add 5 to the numerator

INSTANTLY CENTERS AND CLAMPS ANY SIZE BORING BAR

*without disturbing
alignment of the Bar
Holder!*



• The B & W Bar Holder automatically holds any size boring bar on the center line of the lathe. A separate nut clamps the body of the holder in alignment and need not be loosened in changing or adjusting bars. Bars have $\frac{1}{4}$ " graduations on both ends. Holders and bars in all sizes. Write for literature.

B & W

PATENT PENDING

B & W MANUFACTURING CO. • 3216 DOUBLE DRIVE, EL MONTE, CALIF.

STOP SHIPPING LOSSES BY ANCHORING PRODUCTS

for SAFE DELIVERY



TODAY the keynote in industry is: **Speed up production. Speed up delivery.** Here is a simple, practical suggestion that your packing department should adopt to speed up safe delivery. Instruct your packers to make it a practice to use **EVERLOCK WASHERS** on all bolts and screws used on crates.

With increased traffic, whether by truck or train, severe impacts and jolts are likely to occur. If your products are crated and if they are highly polished, be it wood or metal,

porcelain, enamel, paint or plating, they will reach their destination without a scratch or chip if **EVERLOCK WASHERS** are used to anchor them to the crates. Jolts and shocks in transit drive the **EVERLOCK WASHER** teeth deeper and tighter into the adjoining surfaces.

Many nationally known stove manufacturers and the manufacturers of other types of commodities are using this application daily.

Whether your commodities are household appliances, factory or

office equipment, machinery or furniture, heavy or light, fragile or durable, fasten them rigidly in their crates by using **EVERLOCK WASHERS** on your bolts and screws.

The construction of each **EVERLOCK** tongue holds the secret of the digging-in action of the **EVERLOCK WASHER** tooth. Vibration only serves to drive the teeth deeper.

There is an **EVERLOCK WASHER** of the right size and type for every purpose. Start using them now.

THOMPSON-BREMER CO. 1440 W. HUBBARD ST.
CHICAGO, ILLINOIS

Everlock Washers

OFTEN OTHER WASHERS HAVE BEEN TRIED, NOW EVERLOCKS ARE SPECIFIED

PRINTED IN U.S.A.

Two electrically-heated tanks used for cleaning drills in the Cleveland Twist Drill Co., Cleveland, Ohio.



which gives 37. The denominator will still be 16 multiplied by 3, which is 48. The answer of $11\frac{5}{16}$ divided by 3 will then be $3\frac{37}{48}$. To triple this figure, take $\frac{1}{3}$ of 48, which is 16, for the denominator. Divide 16 into 37, which gives $2\frac{5}{16}$. Multiply the digit (3) of the mixed number by 3, the result of which is 9. Adding $2\frac{5}{16}$ to 9 gives the answer, $11\frac{5}{16}$.

By means of the above described methods, mental calculations are reduced to a minimum and the most rapid answers obtained in each case.

Drills Cleaned with Immersion Heaters

Production on the cleaning of certain types of drills needed in national defense industries has been increased more than five times in the Cleveland Twist Drill Company, Cleveland, Ohio, by the installation of two General Electric 5000-watt Calrod immersion heated tanks.

In the cleaning process, spots and stains are removed from the drills by rotating brushes and a brushing compound. This compound adheres to the drills, and must be removed. It is now removed fast and effectively in the tanks heated by the immersion heaters, the first of which contains a solution of potassium tallow soap just under the boiling point, the second, near-boiling water.

With this method, it is possible to

clean 1000 $\frac{1}{8}$ in. drills in 20 minutes or 4000 to 5000 $\frac{1}{16}$ in. or smaller drills per hour.

The heaters in the tanks are controlled by thermostats and automatic time switches, so that the solution and water are at a constant temperature. The tanks, adequately insulated against heat losses and designed for easy drainage and removal of sludge, are mounted on casters, so that they may be moved wherever 230-volt service is available.

"10 New Ways to Save Time and Labor with Holden Heat - Treating Baths" is the title of an eight-page catalog issued by The A. F. Holden Co., New Haven, Conn., describing Holden Oil, Gas, and Electric Pot Furnaces which are available for every heat-treating application from 300 to 2,500 deg. F. A double-page spread treats the 10 new fields for Holden Salt Baths; namely, normalizing of forgings, scale free forgings, continuous salt bath hardening, wire patenting, heating of soldering irons, direct process annealing, silver soldering, austempering, descaling bath, and bright tempering.

Copy of the catalog will be sent free of charge to any executive addressing a request to Research Director, The A. F. Holden Co., 200 Winchester Ave., New Haven, Connecticut.

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October



Over the Editor's Desk

War Progeny

WAR takes its toll in many places, but inasmuch as fighting equipment and materials are made principally from metals, it is in the use of metals that the scarcity of materials for the equipment of everyday living is first felt. When vast quantities of iron, steel, aluminum, copper, tool steels, and the important ingredients of tool steels are requisitioned by the Government for defense purposes, substitutes for these materials must be found if the level of living facilities is to be maintained.

Already the extent which substitutes have been adapted is fairly amazing. The most important substitute is, of course, the materials which in their various forms are termed "plastics." The plastics referred to are substances made from vegetable matter such as cotton, flax, soy beans, wood pulp, rubber, phenolic resins, phenol and formaldehyde, paper, cellulose, and necessary acids and gases.

Plastics are not new; they have been in evidence for years in the form of small ornaments and decorations as well as certain useful products. In the industrial field, plastics have long been used in the manufacture of gears as well as washers and other parts. From now on for the next few years plastics will "pinch hit" for metals in many cases.

At the present moment, Ford engineers are said to be experimenting with flax straw in the making of plastics and plans are in progress for the use of "wool" made from soy beans to be used in automobile upholstery padding. A plant has been established to manufacture plastic hand-wheels for machine tools. The Piper Aircraft Corporation is now marketing a new

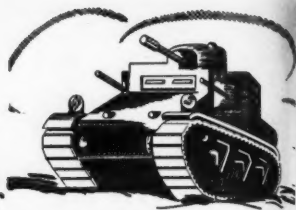
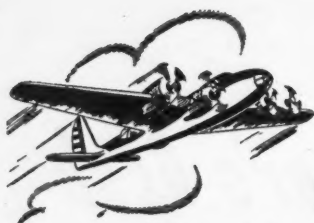
type of plastic — plywood pontoon — that has recently been approved by the CAA.

Ventilators made from a transparent plastic are now being used in aircraft cabin ventilation. A new acid-handling pump has an impeller, resilient sleeve, split gland, and lantern ring all of which are made from a high tensile plastic. Renewable plastic hammer heads replace those of rubber which are used in the furniture industry. A conveyor apron made from plastic replaces brass tubes formerly used in the construction of textile conditioning machines. Sink spray handles molded of plastic materials are now featured as standard equipment by plumbing manufacturers.

Gun brushes with bristles made from plastic (nylon) are now available and tests show that these brushes wear seven times as long as the natural bristles previously used. The "tin hats" worn by our defense forces in the field can now be made from a plastic consisting of 50 per cent cotton and 50 per cent soy bean. These elements will withstand a blow of 40 foot-pounds, which is all that the human neck will stand.

Colored plastic row boats are now being made for the market. Etched, clear plastic balustrade on the stairs to the mezzanine is a feature of a smart new Florida hotel. A plastic bowling alley has been developed which, inasmuch as this material is not subject to deterioration by water or sunshine, will make the game an outdoor sport. Even Christmas trees for the coming season are being made from plastics which will make possible a variety of lighting effects.

Necessity — the mother of invention — will be extremely fertile during the next few years.



Tools For National Defense

Gorton Model M-E Munitions Engraver

To ease the strain of producing standard engraving machines, the George Gorton Machine Co., 1318 Racine St., Racine, Wis., has developed a stripped-down machine designed especially for defense work and designated as the Model M-E Munitions Engraver.

Both the standard and munitions en-

gravers are being used in defense work to engrave or profile such parts as gun range scales, indicator plates, gun barrels, airplane propeller pump housings, range finder bands, gun sight dials, gun elevation scales, air temp dials, and many other parts for guns, planes, ships, tanks, bombs, shells, torpedoes, and so on.

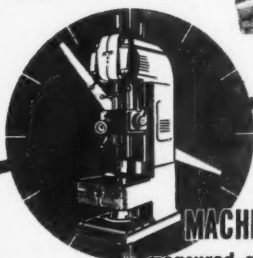
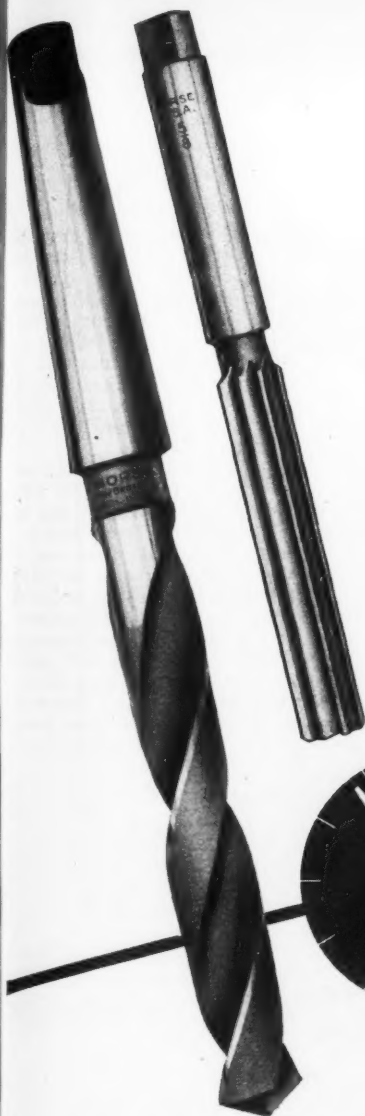
By eliminating many of the controls and adjustments necessary to give standard machines their versatility, the Model M-E can be produced nearly three times as fast. According to the manufacturer, this is done without sacrificing accuracy and without impairing the Munitions Engraver's ability to handle the work for which it is designed.

Simplification has been achieved by the use of an improved spindle drive, which eliminates the need for several parts and assembly operations, and by providing the Model M-E with a fixed pantograph reduction ratio. (Standard machines permit reductions ranging from 2:1 to 40:1.) Further savings in both materials and labor are said to result by having a table which is only adjustable vertically to provide for differences in the height of work.

Stock tools and accessories used with the standard engraving machines can be used equally well with the Munitions Engraver.



Gorton Model M-E Munitions Engraver



MACHINE TOOL PRODUCTION . .

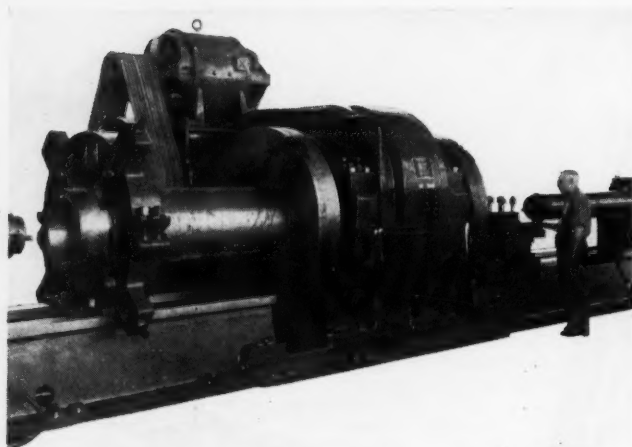
is measured at the workhead. It goes up or down - with the quality of the tools. So give your operators MORSE TOOLS . . . maximum efficiency at the cutting head. Then you'll see why many plants have increased the capacity of their machine tools without buying new equipment.

MORSE

**THERE IS A
DIFFERENCE**

**TWIST DRILL AND
MACHINE COMPANY**
NEW BEDFORD, MASS., U. S. A.

NEW YORK STORE: 130 LAFAYETTE ST. - - CHICAGO STORE: 570 WEST RANDOLPH ST.



Opposite End View of
Wickes Double End
Boring Lathe

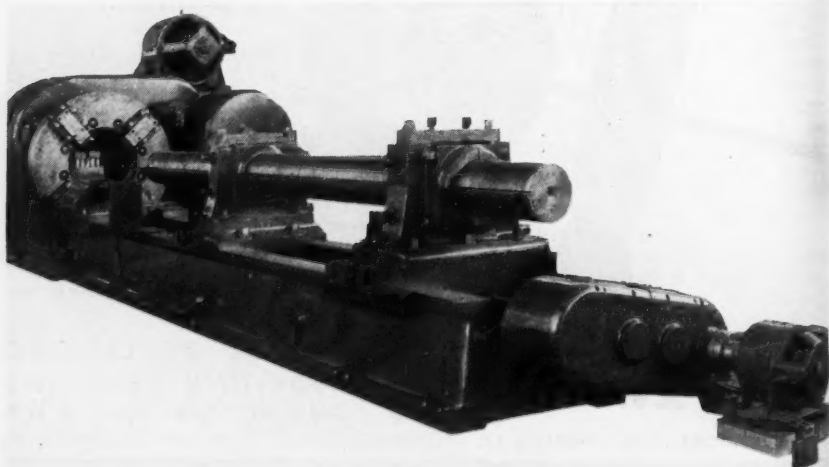
thereby eliminating the need for special tools, with the possible exception of work-holding fixtures.

Wickes Brothers Double End Boring Lathe

Wickes Brothers, Saginaw, Mich., have brought out a line of double end boring lathes designed especially for boring hol-

low steel forgings such as torpedo air flasks, guns, and similar items of ordnance. The machine shown in the illustrations is the Wickes 30-in. x 25-Ft. x 25-Ft. Double End Boring Lathe. The machine illustrated is built with a 30-in. hollow spindle. There is a bed on each end of the machine, each bed being 25 ft. long. Each end of the bed is also equipped with a 12-in. x 20-ft. forged steel boring bar, which makes it possible to bore the hollow forgings from both ends of the machine simultaneously. The machine is arranged with independent feed box on each end, driven by a variable speed d.c. motor, and with power rapid traverse. The main drive motor is 50 h.p., variable speed, with

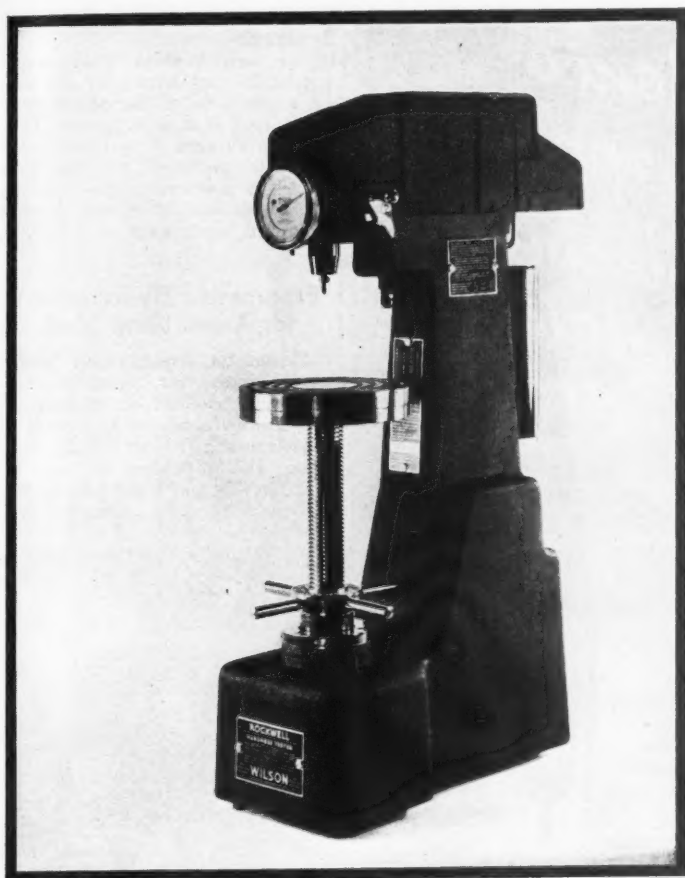
Wickes Brothers 30-In. x 25-Ft. x 25-Ft. Double End Boring Lathe



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"ROCKWELL" HARDNESS TESTER

1921

Twenty years ago we started to make these testers for the metal working industry.

Today we are making them better than ever to meet their present important application — defense.

1941

Concord Ave. & 143rd St.
New York, N. Y.

WILSON
MECHANICAL INSTRUMENT CO. INC.

or, 1941

October, 1941

MODERN MACHINE SHOP 169

Conco Torpedo Electric Hoist



**Double Drum
Construction — Push
Button Control — Elec-
tric Solenoid
Brake**

**Hook, Bolt
or Trolley
Suspension — Anti-
Friction
Bearings—
Enclosed
Gearing**

Built to take a beating! It's got the speed, the power, the durability to stand the gaff of today's high-speed production. Available in 250 Lb. Capacity—\$139.50; 500 Lb. Capacity—\$149.50; 1000 Lb. Capacity—\$159.50. Simple design—only two gear reductions. From finest grade material. Write direct for bulletin on this and other hand-power and electric cranes, hoists and trolleys.

Conco Engineering Works

**DIVISION ST.
MENDOTA, ILLINOIS**



three mechanical speed changes in the headstock.

The forged steel workpiece is supported in and driven by the face plate on either side of the center drive headstock, and is also supported in the lower jaw steadyrests. A portable spotting carriage is provided for the preliminary work on the end of the forging.

The net weight of the machine, with electrical equipment, is 183,000 pounds.

Progressive Hydromatic Welder for Assembling Shell Cases

Cases for transporting loaded 25-lb shells, ready for firing, are now being assembled welded on a Progressive Hydromatic Welder at a rate of 180 complete cases per hour. With 24 welds per case, the machine is thus producing 4,320 welds per hour. Assembly specifications call for unusually close tolerances.



Progressive Hydromatic Welder Spot-Welds Case for Transporting 25-Lb. Shell

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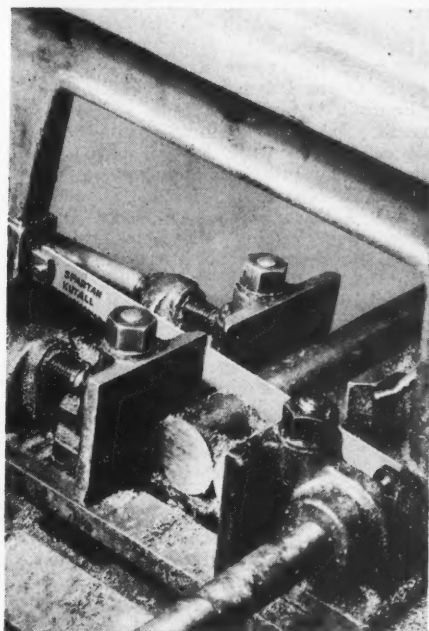
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SPARTAN BLADES Speed Up Defense



"On Any Cutting Job, They're Superior"

The photograph above shows a fast, tough Kutall Blade doing a cutting job on Defense Production.

SPARTAN KUTALLS are made of Molybdenum and special alloy high speed steel. They give you the maximum in cutting efficiency, value and service.

Spartan offers you five special types of Hack Saw Blades; also Band Saws.

See your distributor today.



ances for this type of work to hold the shell firmly and permit stacking of cases for transportation.

Designed by Progressive Welder Co., 3023 E. Outer Drive, Detroit, Mich., the Hydromatic is equipped with a power-clamping fixture to facilitate loading and unloading. The parts for the case are dropped over and into the locating fixture which also forms one of the electrodes. A lever is pulled down and plates come against the work under power, thereby clamping the parts firmly in the fixture and against the inner electrodes. The 24 welding gun units then move in against the work, and the welding cycle commences. On completion of the welds, the points move away from the work, the clamps are retracted by reversing the lever, and the assembled case is removed. Operation is completely automatic from the moment the clamping action is started until the case is ready for removal.

The welding units, power assembly, and guns are all of standard design as in other Progressive Hydromatics, only the fixture and base being of special construction.

Udylite Automatic Polishing Machine

The Udylite Corporation, Detroit, Mich., announces the development of an automatic polishing machine for buffing aluminum aircraft engine pistons. This machine is said to have reduced production time 97½ per cent in comparison with the old-fashioned method of buffing pistons by hand on a manually-operated buffing lathe. The machine shown in the illustration, buffs the sides and top in 15 seconds as against 10 minutes with the hand operation.

The machine consists of an index table which indexes automatically. There are 12 chucks to hold the pistons which rotate during the buffing operation. The chucks are stationary during the indexing period and during the loading and unloading. Six buffing pedestals are arranged around the machine to accommodate the buffing wheels which are driven through a "V" belt drive. The buffing heads have the exclusive Udylite feature of "full-float." Buffing pressure is adjustable by means of a tension



**MILLIONS
of STROKES**
for
Defense
with
PRODUCTIMETERS
on the job!

Equip Your Machines
 Model 5-H-1 for Heavy Duty
 Model 5-D-1 for Light Duty
 Over 100 Models to choose from . . . Strokes,
 Rotary, Lineal, Pre-determined, Electric . . .
 Ask for BULLETIN No. 7 and indicate style
 of counter that interests you.
DURANT MANUFACTURING CO.
 1932 N. Buffum St. 173 Eddy Street
 Milwaukee, Wis. Providence, R. I.



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LAPPING PRECISION

STARTS IN THE CLOVER CAN

To thousands of machinists to whom precision lapping is a fine art, the name CLOVER COMPOUND stands for free-cutting that turns out a job to specification in less time and with less effort.

Clover is a laboratory-prepared compound of superior, super-sharp, super-graded Silicon Carbide abrasive grain held in suspension in an especially processed, hard oil binder that not only acts as a perfect lubricant but which will not melt under the heat of friction. No wonder Clover Compound—in the famous green can—has been industry's standard for 38 years. The sale of over 40 million cans tells the story!

Your distributor stocks Clover. Order the grade you need, today. Accept no substitutes. CLOVER MFG. CO., NORWALK, CONN.

CLOVER QUALITIES YOU WILL WELCOME!

Super-sharp, diamond-hard Silicon Carbide grain—non-magnetic; eight grades from microscopic fine to very coarse ★ **Special heat-resisting, petroleum hard oil binder**—maintains uniform consistency and grain suspension ★ **Fast-cutting, cool-cutting**—does not burn ★ **Non-corrosive**—does not affect work or operator ★ **Keeps perfect mechanical mixture**—withstands extreme friction temperatures.

ASK US ALSO ABOUT CLOVER COATED ABRASIVES

Supplied in sheets, rolls, belts, discs, sleeves and other shapes in Aluminum Oxide, Silicon Carbide and Emery, as well as Garnet and Flint; in paper, cloth and combination backings. There is a Clover Coated Abrasive at the right price for your every sanding need. See your distributor; or write us. Send for informative Abrasive Manual—and for facts on generous free trial offer. Address DEPT. R.



QUALITY ABRASIVES SINCE 1903

GRINDING AND LAPPING

CLOVER *Compound*

in the Green Can—Famous for 38 Years

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Designed by Progressive Welder Co., 3023 E. Outer Drive, Detroit, Mich., the Hydromatic is equipped with a power-clamping fixture to facilitate loading and unloading. The parts for the case are dropped over and into the locating fixture which also forms one of the electrodes. A lever is pulled down and plates come against the work under power, thereby clamping the parts firmly in the fixture and against the inner electrodes. The 24 welding gun units then move in against the work, and the welding cycle commences. On completion of the welds, the points move away from the work, the clamps are retracted by reversing the lever, and the assembled case is removed. Operation is completely automatic from the moment the clamping action is started until the case is ready for removal.

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**MILLIONS
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Defense
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on the job!

Equip Your Machines

Model 5-H-1 for Heavy Duty
Model 5-D-1 for Light Duty

Over 100 Models to choose from . . . Stroke,
Rotary, Lineal, Pre-determined, Electric . . .
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DURANT MANUFACTURING CO.
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ASK US ALSO ABOUT CLOVER COATED ABRASIVES

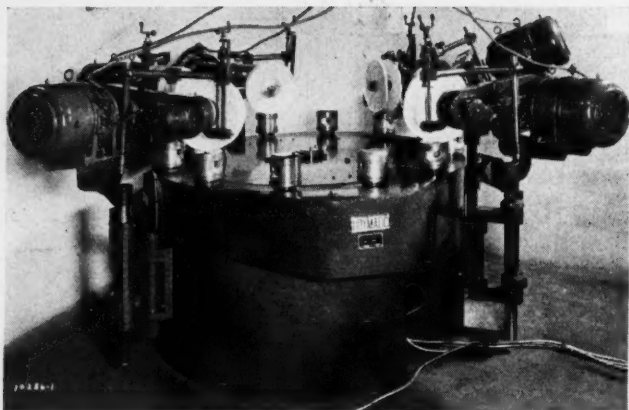
Supplied in sheets, rolls, belts, discs, sleeves and other shapes in Aluminum Oxide, Silicon Carbide and Emery, as well as Garnet and Flint; in paper, cloth and combination backings. There is a Clover Coated Abrasive at the right price for your every sanding need. See your distributor; or write us. Send for informative Abrasive Manual—and for facts on generous free trial offer. Address DEPT. R.



QUALITY ABRASIVES SINCE 1903

GRINDING AND LAPPING
CLOVER *Compound*

In the Green Can—Famous for 38 Years



Udylite Automatic
Polishing Machine

merely changing work holding chucks or fixtures. Any buffing adjustment to contact surfaces requires but a few minutes. One operator is required to load and unload.

spring so that the buff rides over the work to provide uniform buffing pressure at all points. The wheels may be adjusted to any angle desired.

One of the principal features claimed for this machinery by the manufacturer is its versatility. The machine may be adapted to a variety of circular parts by

Detroit Shell Thread Gages

To meet accelerated defense production needs, Detroit Tap & Tool Co., 8432 Butler St., Detroit, Mich., has brought out a line of high precision thread gages for checking both internal and external threads on various sizes and types of

WHERE TOOLS BELONG

De Luxe

HALL O'WELL

**STEEL
TOOL CABINET**

Exceptionally sturdy, smart looking and useful, this handy cabinet on casters may save many times its own small cost. Keeps tools under lock and key right next to the job! Many other types for different needs; write for catalog.



STANDARD PRESSED STEEL CO.

JERKINTOWN, PENNA.

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BOSTON • DETROIT • INDIANAPOLIS • CHICAGO • ST. LOUIS • SAN FRANCISCO

Fig. 1748

SKILSAW TOOLS MAKE AMERICA'S HANDS MORE PRODUCTIVE!

... speed up every job
that needs doing!

Industry no longer is making time ... it's making time with SKILSAW TOOLS. By saving minutes on every operation, these high-grade tools save hours on each job ... days on each project ... weeks in America's defense! That's why more and more SKILSAW TOOLS are on duty throughout the land ... serving industry better ... making America's hands more productive. In your plant are countless jobs that SKILSAW TOOLS can speed. Your distributor will gladly demonstrate them. Prompt delivery on SKILSAW TOOLS for every defense need!

SKILSAW, INC., 5017 E. 48th Ave., Chicago
New York ... Boston ... Buffalo ... Phoenix
Cleveland ... Kansas City ... Atlanta ... St. Louis
Dallas ... Los Angeles ... Oakland ... Seattle
Portland, Oregon ... Toronto, Canada

SKILSAWS

Saw 10 times faster than by hand! Save time in blast expansion, remodeling, maintenance ... in shipping and receiving rooms ... cutting Ceolite, Transite, composition ... cutting flat or corrugated metals. 9 Models.

SKILSAW BELT SANDERS

Finish finer ... faster, and at lower cost! All finishing and refinishing is faster in production or maintenance work. Ideal for every job from coarsest sanding to finest honing on wood, stone, metal or composites. 4 Models.

SKILSAW DRILLS

More drilling power ... more holes per hour! Speed up all drilling from lightest production work to heaviest boring and reaming in wood, steel and composites ... in maintenance or production. 22 Models.

SKILSAW DISC SANDERS

Grind away waste ... grind down cast! Speed up all filing, grinding, sanding, polishing, buffing and metal cleaning. They work equally well on flat and curved surfaces of wood, metal, stone, tile and composites. 5 Models.



sion, providing a quintupling of production facilities. The expansion provides particularly for increased manufacturing facilities on large thread, plug, and ring gages (2 in. in diameter or over), such as used in shell production, and so on.

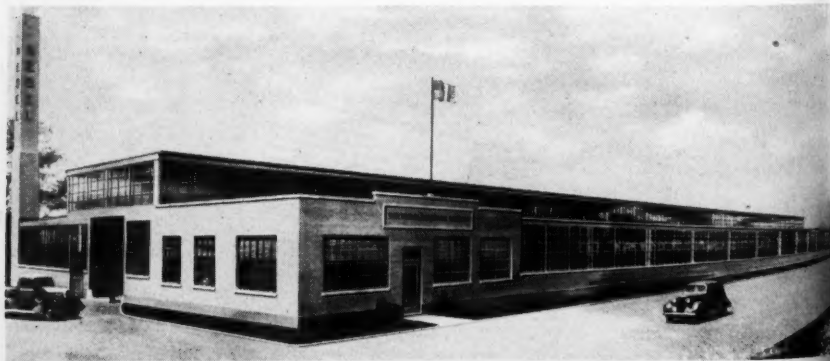
shells. The threads of the gages are precision-ground and precision-lapped with precision-ground thread-laps. A high wear-resisting alloy, developed especially for the purpose, is used. Detroit Shell Thread Gages are already in use in the plants of several large shell producers in the middle west.

Plug gages for checking internal threads are of the reversible type, thereby virtually doubling the useful life of the gages, while ring gages are adjustable and may be reconditioned and reset when worn with the use of precision-ground Detroit setting gages. The Detroit Shell Thread Gages are supplied adjusted and locked in position for immediate use.

Detroit Tap's gage production facilities are now undergoing further expansion,

New Plant of Nebel Machine Tool Company

Modern design and layout are the principal features of the new plant recently completed by the Nebel Machine Tool Company, Cincinnati, Ohio. The building is of one-story brick and steel fireproof construction, of the monitor type. It has three bays 90 ft. wide by 260 ft. long, the center bay being equipped with three electric traveling cranes. All castings and materials are received at the south end of the building and are routed through the various stages of manufacture to completion at the north end of the building. All machine tools operate with individual motor drives. The fluorescent type of lighting is used, and painting and grinding departments are equipped with suction dust-collecting systems. The offices are air-conditioned.



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Buckeye
LUBRICO
BEARINGS

HAVE WON A WAR THAT NEVER MADE THE HEADLINES

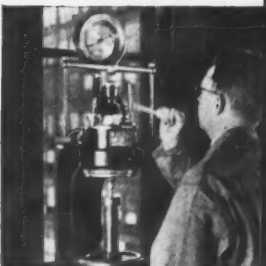
• Manufactured from virgin metal under Buckeye's exacting laboratory and metallurgical control, "Lubrico"—Buckeye's high lead bearings, possess the many favorable features users want in bearings of this type—yet cost little more than bearings of more standard analysis. They are ideally used for airplane parts, pumps, seal rings, high speed shafts, in processing machinery where lubricant is maintained only at minimum levels to prevent contamination of the material, and other services where shaft scoring or sizing would be critical. Furnished in any ID, OD and length; plain, slotted, drilled or flanged to customer's specification. Three grades to meet exactly the requirements of different services. Can we send you more details?



*Chemical Testing to
Check Metal Analysis*



*Micro-photographing
the Grain Structure*



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THE PRECISION-MADE LINE
Ready-to-use industrial bear-
ings; cored and solid fully
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phosphor bronze analysis,
are stocked throughout the
country for your convenience.
Ask us also about rough bars,
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Standardize on Buckeye Bearings

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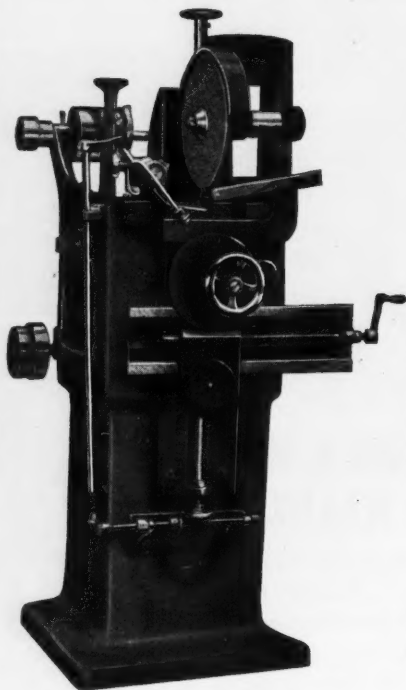
CLEVELAND, OHIO

COVEL HANCHETT

Presents

No. 12

Metal Saw Sharpener



Features . . .

Full automatic grinding of hot and cold metal cutting saws up to 54" in diameter. Ball bearing grinding wheel spindle. Handwheel control for adjustment of feed and depth of tooth.

Secure full production from your saws at a minimum re-grinding cost.

Your saws are an important part of your production set-up and merit the best of modern equipment for their care.

Saw Sharpeners 2" to 120" Capacity.

Knife and Shear Grinders to 220" Capacity.

COVEL HANCHETT CO.

BIG RAPIDS, MICH.

PORTLAND, ORE.

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THE ACME
MACHINE TOOL CO.

Savings
**IN TURRET
LATHE TIME**
while
**ROUGHING OUT
GEAR BLANKS**

CINCINNATI ACME UNIVERSAL TURRET LATHES

• This is one of five recently installed CINCINNATI ACME Universal Turret Lathes at the CINCINNATI GEAR COMPANY used for the production of all types of gears from various kinds of steels.

We show one of these turret lathes roughing out bevel gears and the "Gear Company" reports that the turret lathe time on one job was reduced from 18 to 10 minutes per piece and comparable savings are being made on

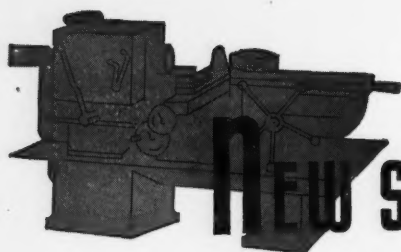
all the new Acme Turret Lathes.

Cuts as deep as $\frac{5}{8}$ " with .027 feed running at a cutting speed of 275 S. F. M. with cemented carbide cutting tools are made possible by the power, speed and rigidity built into this modern turret lathe.

You, too, can effect similar savings on your turret lathe work. Write for data from samples or ask for a bulletin.

ACME

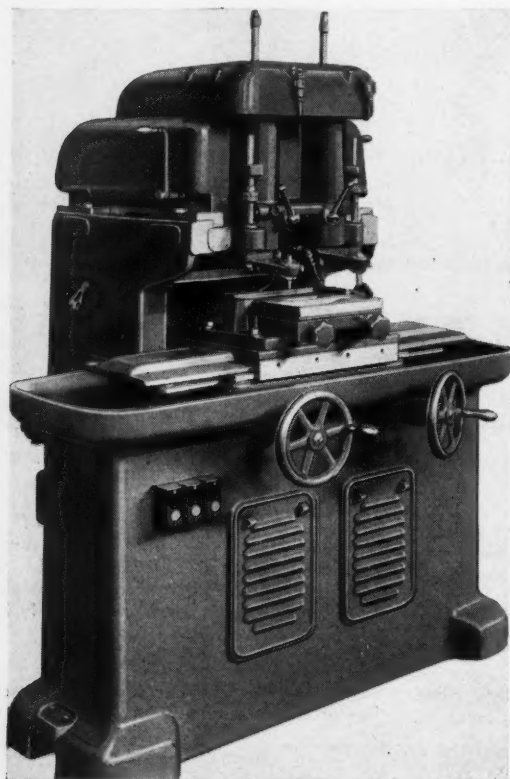
MACHINE TOOL CO.,
CINCINNATI, OHIO.



NEW SHOP EQUIPMENT

"Red Ring" Hand Profiler

Particularly useful in the production of intricate mechanical parts such as those incorporated in the breech mechanism of small arms and machine guns, as well as for producing certain aircraft parts and bearings, the "Red Ring" Hand Profiler illustrated here-



with has been brought out by the National Broach & Machine Co., 5600 St. Jean, Detroit, Mich. The machine operates on the principle of duplicating in the work part the profile of a master pattern by properly guiding an end mill using the master pattern as a guide.

The head carries two cutter spindles 10 in. on centers which can be used simultaneously. In order for a cutter to trace the path of an irregular curve, movement must be provided in two directions in a horizontal plane. The head carrying the cutter spindles moves toward and away from the operator as the latter faces the machine. The maximum head travel is 4 in. each way from center.

Simultaneously, the table, which carries the work and has a capacity for two work fixtures, moves laterally at right angles with the path of head movement. The maximum travel of the table is 10 in. each way from center. Thus, the total area covered by a cutter is 160 sq. in. Both the head and table slide are equipped with adjustable stops to limit travel in either direction. Hence, by locking either slide, linear milling may be performed without using a master pattern. Both head and table movement in horizontal planes are made by manipulating handwheels conveniently located at the front of the machine, one wheel for each slide. Wheel rotation is transmitted to the slides through helical gears and racks.

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"Red Ring" Hand Profiler

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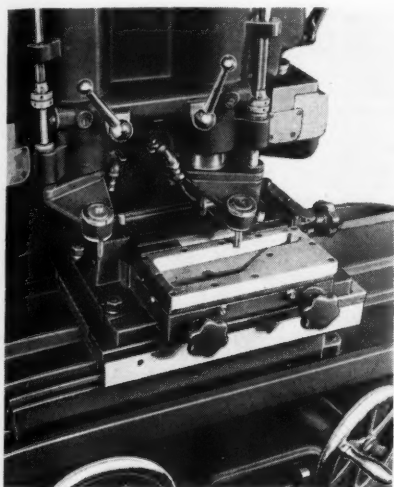
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massive construction to eliminate vibration both the head and table respond instantly to finger-tip pressure on the handwheels. According to the manufacturer, the very unusual smoothness of the head and table movement facilitates constant bearing of the guide pin on the contour of the master pattern, provides the significant feel of cutter feed, and assures accuracy of cutter travel. This smoothness is obtained by carefully distributing and balancing the



View of Table of "Red Ring" Hand Profiler Showing Table Set Up for Operation

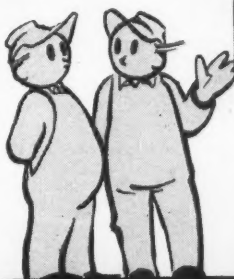
weight, also by mounting the slides on large diameter precision roller bearings, which operate against tracks that are hardened and accurately ground. Contributing also to the positive motion of the head and table are bearing and slide adjustments to prevent backlash or lost motion.

Each spindle has a micrometer adjustment for the depth of cut and is spring counterbalanced for instant retraction when the locking handle is released. Vertical cutter feed is actuated by cranks at either side of the head. Five spindle speeds are provided by the use of stepped sheaves which are mounted on the spindle and motor shafts. The drive is by means of V-belts. Each spindle has a separate motor.

Standard tool drivers (General Motors collet type) have a capacity for end

NEW UNIVERSAL FLOATING CHUCK NO MARRED HOLES NO DOGTAIL MOTION

Operates horizontally in automatic screw machine or turret lathe. Adjustable spring pressure in 4 directions counterbalances weight of tool and prevents marred or bell mouthed holes. Useful in any operation where piloting from the lead hole is required. Write for catalog.



UNIVERSAL

Engineering Company
Frankenmuth, Mich.

mills up to $\frac{3}{4}$ in. in diameter. Each tool driver has a No. 9 Brown & Sharpe taper. A drawbolt is used for locking tools.

The follower pin, which, in operation, contacts the contour of the master pattern, is tapered on a 6-deg. angle to correspond with the angle on which the sides of the master pattern are cut. The pin, in addition to having a vertical adjustment, has a $1\frac{1}{6}$ -in. lateral adjustment to compensate for changes in cutter diameter due to sharpening. Coolant from a tank in the base is piped to a jet for each cutter.

Van Norman No. 118 Automatic Bed-Type Milling Machine

Designed for high production milling of small and medium-sized parts, an automatic bed-type milling machine with hydraulic table feed has been added to the line of millers manufactured by the Van Norman Machine Tool Co., Springfield, Mass. The machine, which is designated as the Model No. 118, incorporates many outstanding features including automatic table cycle,

automatic spindle stop, rigid construction, and ease of operation.

The spindle transmission, which is located in a compartment at the rear of the bed, is driven by a 3 h.p. motor, hinge-mounted to facilitate belt adjustment to the main drive pulley. Spindle speed changes are obtained through pick-off gears accessible in a housing at the rear. The spindle drive is transmitted through a vertical shaft to the spindle head assembly, then through large gears to the spindle. Reverse to the spindle is by means of a lever located at the left side of the bed. The lever can be moved in either direction for left or right-hand rotation of the spindle. The spindle drive gears, which are located in a housing mounted on the quill, are provided with a high-low series. The selection of either range is made through a lever which is moved up for the high range and down for the low range. A spindle speed plate located on the door of the pick-off gear housing lists the gear combinations required for obtaining any of the 12 speeds, which are arranged from 30 to 1,000 r.p.m. in geometric progression.

The spindle head slide, which forms one of the unit assemblies of the machine, is mounted on heavy box-type ways cast integral with the upright column. A large hand-wheel with graduated dial is provided for raising and lowering the head slide as desired. The front gib of the spindle head slide is provided with two locking screws so that the head can be clamped firmly in place.

The hydraulic mechanism for operation of the table comprises a pump and main control panel together with necessary valves, all of which are located in a compartment at the front of the machine. The drive for the hydraulic pump is taken from the front end of the main drive shaft of the spindle transmission.

The hydraulic feed cylinder is mounted on the bed directly under the table and is connected through the bed

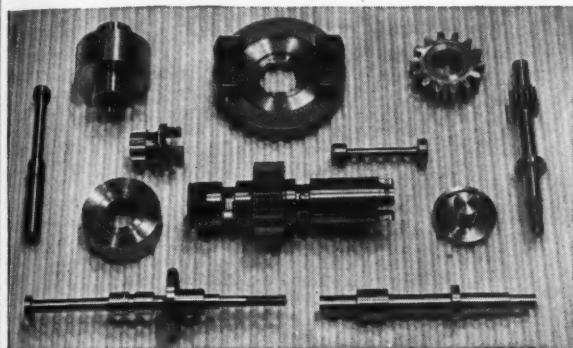


Van Norman No. 118 Automatic Bed-Type Milling Machine

TOOL-LIFE INCREASED

from 60 to 650 pieces

BETWEEN GRINDS



These are typical high-precision, super-finish parts on which substantial and, in some instances, phenomenal increases in tool-life are noted, as result of using **TEXACO CUTTING AND SOLUBLE OILS**.



THEY made an impressive record on their Warner and Swasey Lathes, when they increased tool-life from 60 to 650 pieces between grindings!* The most important change to bring about this vast improvement was the change to *Texaco Transultex Cutting Oil A*.

Texaco Transultex assures the super-finish and close tolerances demanded by this prominent shop. It will assure you of better results, because it cools both the work and the tool, thus preventing chip welding.

The outstanding performance that has made *Texaco* preferred in the fields listed in the panel has made it preferred also in the metal cutting field.

These *Texaco* users enjoy many benefits that can also be yours. A *Texaco* Engineer specializing in cutting coolants will gladly cooperate . . . just phone the nearest of more than 2300 *Texaco* distributing plants in the 48 States, or write:

The *Texaco* Company, 135 E. 42nd St., N. Y., N. Y.

*Name on request.

TUNE IN FRED ALLEN—*Texaco* Dealers invite you to enjoy Fred Allen in the full-hour program of "The *Texaco* Star Theatre" . . . with Kenny Baker, Al Goodman's Orchestra and a great cast. Every Wednesday night, Columbia Network, 9:00 E.S.T., 8:00 C.S.T., 7:00 M.S.T., 9:00 P.S.T.

THEY PREFER TEXACO

- ★ More stationary Diesel horsepower in the U. S. is lubricated with *Texaco* than with any other brand.
- ★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with *Texaco* than with all other brands combined.
- ★ More locomotives and cars in the U. S. are lubricated with *Texaco* than with any other brand.
- ★ More revenue airline miles in the U. S. are flown with *Texaco* than with any other brand.
- ★ More buses, more bus lines and more bus-miles are lubricated with *Texaco* than with any other brand.



TEXACO Cutting and Soluble Oils

FOR THE METAL-WORKING INDUSTRY

RETURN METAL DRUMS PROMPTLY . . . thus helping to make present supply meet industry's needs and releasing metal for National Defense

at the main operating panel. Table dogs for automatic control of the main operating panel are located at the front of the table and are easily adjusted as desired.

The main operating panel has a control lever located at the right side which can be set manually to any one of four positions; namely, neutral, rapid advance, feed, and return. The Vari-Throttle valve for setting the table feed rate, located at the left of the control lever, is adjusted by means of a knurled dial that can be quickly adjusted to the desired feed rate. The dial is provided with a lock so that once the predetermined feed rate has been made, the setting can be permanently locked.

The spindle clutch, which is situated in the spindle transmission compartment, is operated hydraulically by means of a clutch lever located in a panel at the right front side of the machine. Engagement of this lever instantly stops or starts the spindle. The machine, however, can be equipped with an automatic spindle stop which provides for automatic engagement and disengagement of the spindle in relation to the travel of the table. By means of this feature, the spindle can be started automatically when the main

operating lever is thrown to the rapid advance position and the spindle automatically stopped when the table is reversed.

The normal cycle of the machine is rapid-traverse advance, normal milling feed, then an automatic rapid-traverse return to the starting position. By means of additional table dogs, however, skip-stop table cycles can be obtained.

The general specifications of the Van Norman No. 118 Milling Machine are as follows: working surface of table, 34 x 10 in.; longitudinal power feed of table, 18 in.; table feed range, $\frac{1}{2}$ to 40 in. per minute; rapid traverse, 200 in. per minute; vertical movement of spindle head slide, $7\frac{1}{2}$ in. with a minimum of 2 $\frac{3}{4}$ in. from top of table to center line of spindle; cross adjustment of quill, 3 $\frac{1}{2}$ in. with a minimum of 3 in. from the center line of the table to the face of the spindle; floor space required, 65 x 46 in.; total height, 61 in.; weight, 3,600 pounds.

Barnesdril No. 1 Horizontal Hydraulic Honing Machine

To meet the demand for a small size horizontal honer, the Barnes Drill Co., 801-851 Chestnut St., Rockford, Ill., has brought out the Barnesdril No. 1 Horizontal Hydraulic Honing Machine shown herewith, which has a capacity for honing long bores up to 1 $\frac{1}{2}$ in. in diameter. The standard working stroke of the machine is 8 ft.; however, the machine can be made with a shorter stroke of 6 ft. or up to a maximum stroke of 12 feet.

The main bed comprises a fabricated elongated frame which is provided with horizontally disposed hardened bar ways upon which the spindle head or carriage is movably supported. A smooth, shockless, reciprocating movement is imparted to the spindle carriage by a hydraulic cylinder and piston. The power plant for providing the reciprocating movement, which includes a hydraulic pump and motor, is mounted on one end of the main bed.

The reciprocating control for the working travel consists of an electrically operated hydraulic system. This provides for adjustable stroke stops for any length of spindle travel from 2 ft. up to the full limit of travel, depending upon the length of the machine. Stops may be set for the working stroke and that the exact amount of overrun is provided at each open end of the bore.

MOREY VERTICAL SHAPERS

Built In Two Sizes



8" Stroke
12" Stroke

Accurate — simple
for toolroom manu-
facturing. Self-
Contained
motor drive.

Ask for
Circular
No. 726

MOREY MACHINERY CO., INC.
410 Broome Street New York, N.Y.

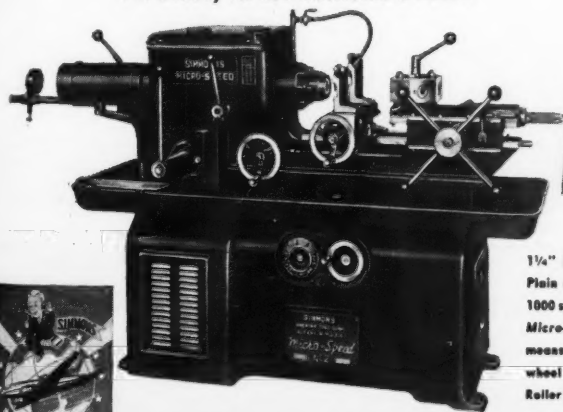
Now it's 20!



Several months ago, N. F. Vanderlipp, General Manager of Fairchild Aircraft Limited, Longueuil, Quebec, wrote: "We are operating eight SIMMONS NO. 2 MICRO-SPEED TURRET LATHES. They are doing well and we are extremely satisfied with their performance. They are being used in the manufacture of the Bolingbroke Bomber."

Today Fairchild has no less than twenty No. 2's on its production line! Here's concrete evidence of high-precision operation, repeated many times by others. We're producing them fast; you're buying them fast. And, best of all, you like them!

Write today for new illustrated brochure



QUICK
DELIVERIES

1 1/4" Bar Capacity—14" Swing. Made in Plain and Back-Geared Types. A range of 1000 spindle speeds is available through the Micro-Speed Drive, all secured instantly by means of the Selector Dial Control hand-wheel on the cabinet base. Timken Tapered Roller Bearings. Spindle brake.



SIMMONS MACHINE TOOL CORP.

1745 NORTH BROADWAY, ALBANY, NEW YORK

NEW YORK CITY OFFICE: 149 BROADWAY

The control also provides a means for entering the hone into and withdrawing it from the work without rotating.

The reciprocating motion is imparted to the honing tool while the spindle rotates uniformly and reciprocates the spindle carriage and tool supporting

chine. A push button station for starting and stopping motors, and an independent manual control for "short stroking" at any point in the hone travel, are also conveniently located at the operator's position. A cradle is provided for supporting a honing tool of any one size in a retracted position and for effectively guiding the tool into and out of the workpiece.

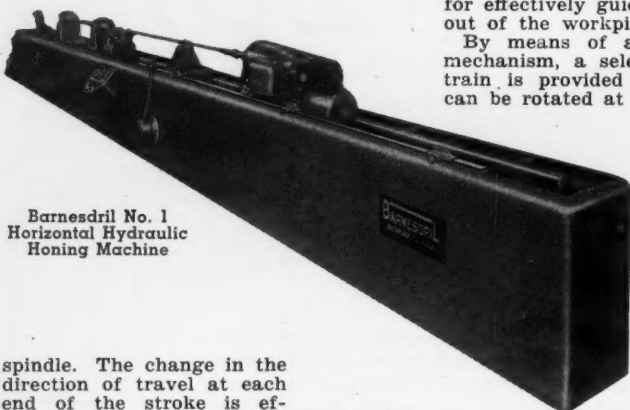
By means of a change speed gear mechanism, a selectively variable gear train is provided whereby the spindle can be rotated at any one of a number

of different speeds. The spindle is rotated by means of a built-in electric motor in the carriage.

The No. 1 machine employs a motor-driven coolant pump. Filter and large reservoirs for coolant are contained in the outboard work supported bed.

Specifications of the Barnesdril No.

1 Horizontal Hydraulic Honing Machine are as follows: capacity (diameter of bore), up to 1½ in.; spindle travel (per length ordered), minimum, 6 ft., maximum, 12 ft.; overall length end to end for standard 8-ft. machine, approx. 24 ft.; swing, standard, 16 in., radius, 8 in.; feed range (lineal ft. per min.), 1 to 70 ft.; net weight, 8-ft. travel machine, 4,500 pounds.



Barnesdril No. 1
Horizontal Hydraulic
Honing Machine

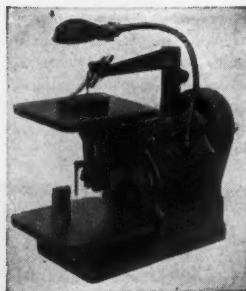
spindle. The change in the direction of travel at each end of the stroke is effected quickly and without shock with controlled overrun so that the surface at these points will receive substantially the same amount of honing as at intermediate points.

The carriage is supported and guided for horizontal movement by four adjustable bronze bearings mounted on the hardened bar ways. The spindle is of short length and has a hydraulic cylinder and piston to actuate full hydraulic hones. Mechanical hones can also be used on the spindle. The socket in the spindle is of No. 4 Morse taper with driver slot and key.

The Barnesdril No. 1 Honing Machine is equipped with a patented unitary manual controlling lever which permits easy and convenient control of the various functional features of the ma-

Hammond "OK" Grinder

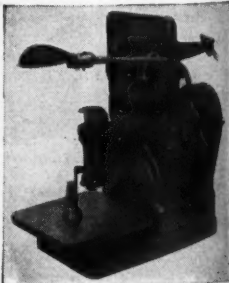
Designed for tool and light snagging grinding, three functionally streamlined "OK" Model grinders, designated as the OK-10, OK-12, and OK-14, have been



New DUPLEX Die and Punch Filing Machine

The exclusive double-purpose tool with adjustable stroke from 0 to 1¼". The Duplex files dies in the conventional way on upper table, and punches with heels or flanges on lower table from above. Note fully enclosed two-speed motor drive. See it at the Metal Show, Philadelphia, Pa., October 20th to 24th, Booth 262.

MARBURG BROS., INC.
90 WEST STREET NEW YORK



The New Line with Newer Efficiency

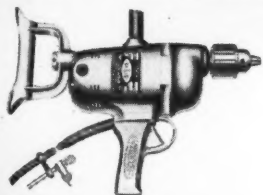
WANT THE BEST?

TRY

SIOUX



HEAVY DUTY ELECTRIC DRILLS



Also Try...

**SIOUX Electric Grinders
SIOUX Electric Sanders**

... for **BETTER** work, **FASTER** work
and **BIGGER** Profits.

Yes, NEW in streamlined design... for better balance and greater efficiency. Redesigned to make them shorter, more compact... for easier handling and greater convenience in close quarters.

Yet they still retain all of the traditional SIOUX trustworthiness... all of the tried and proved SIOUX developments of past years.

Whatever your drilling job may be, you can do it better with a SIOUX Heavy Duty Drill. Sizes and capacities to meet all needs.

Other SIOUX cost reducing items are: Grinding Wheels—Wire Wheel Brushes—Flexible Shafts—Phenol Abrasive Discs—Special Electric Drills and Bench Grinders. Write for details on them or ask the SIOUX Distributor for demonstration.

STANDARD THE

ALBERTSON & CO., INC.



WORLD OVER

SIOUX CITY, IOWA, U.S.A.



INCREASE TOOL LIFE WITH PROPERLY PREPARED COOLANTS

You can save time, increase tool life and improve tooled surface finishes by preparing your soluble coolants and cutting compounds with a "LIGHTNIN" Mixer.

Whether you "make-up" for individual machines or have a central circulating or cooling system, a "LIGHTNIN" of the proper size and capacity is available to solve this problem for you. "LIGHTNIN" MIXERS CAN BE READILY CLAMPED ONTO ANY TANK OR VESSEL. They have been successfully used in large plants for mixing cutting oils for over twenty years!

Write for a catalog of "LIGHTNIN" Mixers. State the size of tank or tanks you use and the current available. Complete details will gladly be furnished.

MIXING EQUIPMENT CO., INC.

1048 GARSON AVE., ROCHESTER, N. Y.

introduced by Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo, Mich. The design of the OK grinder stresses oversize construction for all moving parts such as the spindle and bearings. The base of the machine is heavy cast iron with straight vertical lines unbroken by protruding parts.

Streamlined into the base at the top



Hammond "OK" Grinder

is a heavy duty motor-on-spindle for 10, 12, or 14-in. wheels. The OK grinder can be furnished with either a 1, 2, or 3 h.p. motor for 220 or 440 volt, 3 phase, 60 cycle alternating current. All motors have a spindle speed of 1,750 r.p.m. and are equipped with oversize ball bearings sealed against dust.

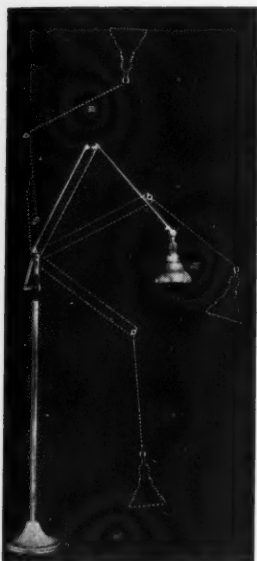
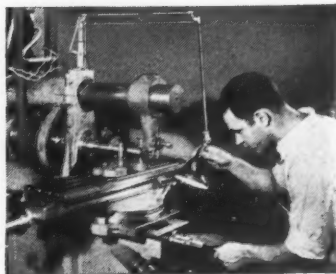
In addition to the motor, standard equipment of the Hammond OK Grinder includes a push-button starter with overload protection, heavy exhaust-type semi-steel guards, adjustable spark deflectors, tool tray and removable water pot, and adjustable tool rests. All moving parts are closely machined and built to rigid machine tool specifications for smoothness and precision in operation.

Float your light



**exactly where
you want it . . .**

It stays put!



Illustrating the flexibility of the Dazor Floating Lamp. Can be placed in literally hundreds of positions.

Yes, float this lamp to *any* position with the touch of a finger. It *stays* there. No adjusting or locking, because a spring scientifically counter-balances the arms.

You raise or lower the Dazor Floating Lamp in just a second. Push, pull or twist it; swing it in a complete circle—always the same firm, stationary light, exactly where you need it.

For shop work, *localized* light is essential: to curtail glare and eyestrain . . . to promote safety. The Dazor Floating Lamp fastens directly to lathes, drills, presses, shapers, milling machines, benches, drafting boards, desks, walls, business-machine stands—anywhere. Also, a portable pedestal type, as shown at left.

Appointed electrical wholesalers have the Dazor Floating Lamp for quick delivery. Call your supplier now . . . or write for literature and distributor's name.

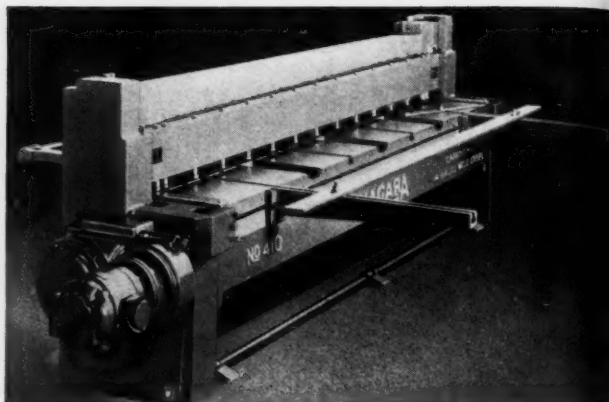
DAZOR MANUFACTURING CORP.
4483 Duncan Ave. St. Louis, Mo.

Dazor Floating Lamps

Fluorescent and Incandescent

Niagara Series No. 4 Power Squaring Shear

The Hammond OK Grinder can also be furnished as a combination grinder - buffer or with each end of the spindle extended to form a buffing and polishing lathe.



Niagara Series No. 4 Power Squaring Shear

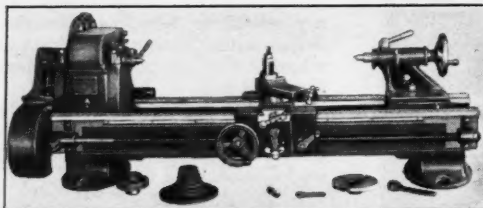
A line of power squaring shears designated as the Series No. 4 is announced by the Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo, N. Y. The Series No. 4 shear is available in capacities of 12 to 16-

gauge and lengths of 4 to 12 ft. By means of the machine, edges can be sheared that are straight to within a very few thousandths of an inch of a straight line without any special skill on the part of the operator. Narrow strips, accurate to gage setting and parallel within close limits, are said to be easily produced without camber or curl.

The Improved "AMERICAN INDUSTRIAL" 12" Back-Geared SCREW-CUTTING LATHE

Automatic
Longitudinal
Feed

THREAD RANGE
—4 to 104 Eng-
lish Measure or
(Optional) 4 to
52 English, 1/4 to
4 1/2 Mm. Metric.
48" Bed.



Automatic
Cross
Feed

Price
\$225.00


F.O.B. Royersford

AMERICAN MACHINE & TOOL CO. of Pennsylvania, Inc., ROYERSFORD, PA.
Sole Export Distributors: SABIN ST. GERMAIN & ASSOCIATES, 21 West St., New York, N. Y.

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BOSTON.....161 Columbus Ave.
CHICAGO.....819 W. Congress St.
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LOS ANGELES.....311 San Pedro St.
MILWAUKEE.....1034 N. Edison St.
MINNEAPOLIS.....515 4th Ave.
NEW ORLEANS.....757 Tchaupt St.
NEW YORK.....37 Walker St.
PHILADELPHIA.....1024 Race St.
RICHMOND, VA.....511 E. Cary St.
SAN FRANCISCO.....156 8th St.
SEATTLE.....316 Occidental Ave.
ST. LOUIS.....119 N. 19th St.



*For Conservation
of Tungsten
with Acceleration
of Production*

Cutting test disks of stock for
anti-aircraft gun barrels.

MO-MAX

MOLYBDENUM-TUNGSTEN HIGH SPEED STEEL

MO-MAX is the original commercial "MOLY" high speed steel. Thousands of tons have been made to produce millions of the highest quality high speed tools. Its years of commercial experience demonstrate that it is a uniform and reliable all-purpose high speed steel.

It has been developed in the cobalt types for those who require cobalt high speed steel.

It is standardized both as to composition and manufacture. This is important to those who buy from several sources of supply. They are assured of getting the same composition which will respond to the same heat treatments.

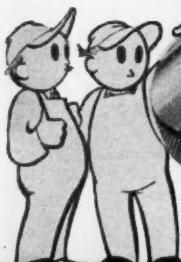
The following general purpose analysis has been in production for many years and is standard with twelve of the principal steel mills:

Carbon, .80 Molybdenum, 8.80 Tungsten, 1.80
Chromium, 4.00 Vanadium, 1.00

Play safe and specify MO-MAX. Leading steel companies have been licensed to produce their own brands of MO-MAX under patents owned by The Cleveland Twist Drill Company.

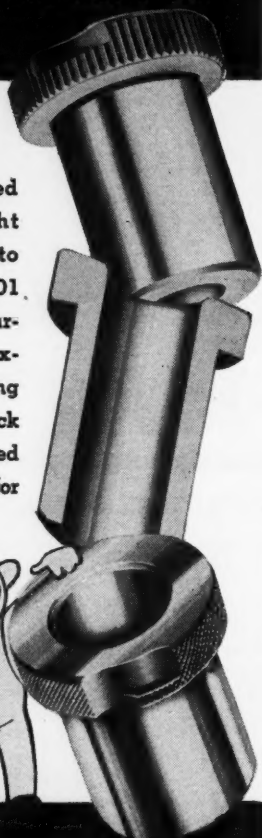
UNIVERSAL DRILL BUSHINGS BUILT FOR LONG LIFE

Superfinished bore straight and round to within .0001 assures accuracy and unexcelled wearing qualities. Black dome. Knurled head. Write for facts.



UNIVERSAL

Engineering Company
Frankenmuth, Mich.



Due to the high operating speed, the instant engagement of the sleeve clutch, the quick release of the hold-down, and the convenient arrangement of features for the operator, strips may be cut at the rate of 75 per minute on 60 cycle current.

The drive, including flywheel, gearing, clutch, eccentrics, and connections, is completely enclosed within the machine and operates in a bath of oil. The machine features a detent device which replaces the customary friction brake and requires no adjustment or attention.

Standard equipment of the Niagara Series No. 4 Power Squaring Shear includes a direct connected 3 phase, 60 cycle, 110 or 220-440 volt a.c., ball bearing, splashproof motor completely wired with magnetic starter and start-and-stop push-button control; one pair of four cutting edge solid tool steel knives, adjustable stainless steel scale inlaid at each end of bed, front gage with two front brackets, side and bevel gages, and ball bearing, self-measuring, parallel operating back gage, adjustable at 1/128-in. increments.

NE-2 Globe Dynamic Balancing Machine

The illustration shows the NE-2 Globe Supersensitive Dynamic Balancing Machine which has been brought out by The Globe Tool & Engineering Co., Dayton, Ohio, for determining the amount and location of the corrections required in overcoming the unbalance in rotating parts ranging from 5 to 50 lb. in weight. The "Micro-Indicator" dial located on the top front of each balancing head indicates and records the amount of correction required in its respective correction plane. The angular location is indicated and recorded by a "Neon-Lite" head. Approximately 30 seconds is required by the average operator in determining the condition of unbalance and required corrections on a typical rotating piece.

The exact amount of correction required for each end can be read directly without cross transfer. This is made possible by an "Equipoise" feature which locks out the unbalance in one plane while reading that in the other. Then, without stopping the machine, the locking point can be shifted to the first plane while reading the unbalance in the second.

The shaft or arbor carrying the rotating work is supported by two-point con-

wi
Speeding
of shells
Airco Ra
an hour
of .45-.50
edges of
torch be
wise the
would be
operation
which A



October

FROM BILLETS *Faster...* TO BULLETS



with **AIRCO** MACHINE GAS CUTTING

Speeding-up an important step in the manufacture of shells is one of the defense jobs assigned to this Airco Radiograph Gas Cutting Machine. 65 blanks an hour are being cut from 3½-inch thick billets of .45-.50 carbon steel. Due to the slightly rounded edges of the billets, this illustration shows a hand torch being used as a preheating medium; otherwise the notched effect between the parallel billets would lower the efficiency of the billet-cutting operation. » » This is but one of the many ways in which Airco gas cutting machines are helping to

accelerate the defense program. Where quantities of machine gas cut parts are required—whether large or small—there's an Airco machine to do the job, quickly, accurately, economically. Visible evidence of this can be seen in hundreds of plants where Airco machines are daily speeding production on thousands of different products. A new booklet describing the No. 4 Radiograph shown above may help end your metal-cutting headaches. A request on your company letterhead will bring a copy promptly.

Air Reduction

General Offices: 60 EAST 42nd ST., NEW YORK, N. Y.

In Texas: MAGNOLIA-AIRCO GAS PRODUCTS CO.

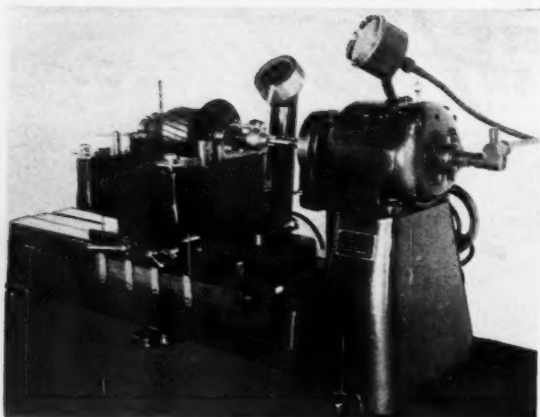
AIRCO DISTRICT OFFICES IN PRINCIPAL CITIES



Anything and Everything for GAS WELDING or CUTTING and ARC WELDING

October, 1941

MODERN MACHINE SHOP 193

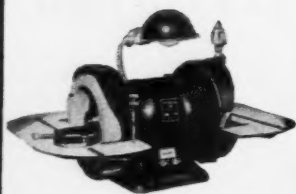


NE-2 Globe Dynamic Balancing Machine

tact from self-aligning ball bearings which are radially adjustable to accommodate a range of shaft sizes from $\frac{3}{8}$ to 1 $\frac{1}{2}$ in. in diameter. Additional sizes may be accommodated by extra saddle adapters. The two-point support thus provided prevents lost motion otherwise encountered due to tolerance in shaft sizes, thereby enabling accuracy of bal-

ance to be obtained. The heads are adjustable along the keyways to accommodate various lengths between bearings with a range of from 5 to 26 in. Corresponding adjustment is available along the "Equipoise" bar, thus providing a quick set-up feature without the necessity of calibration in locking out the proper correction plane in any new piece.

Adjustable resonance is made possible by external snubber springs by means of which a wide range of balancing speeds may be obtained. Variable speed drive is provided from a special variable speed motor driving through a double-knuckle universal joint and chuck to the shaft. Speeds from 0 to 5,000 r.p.m. can be obtained in an



MODEL AA

\$99.50

**Write for details
of free trial offer.**

PROMPT DELIVERIES

Prosser CARBIDE TOOL GRINDER

Removes metal fast when rough grinding.

Finish grinds smooth, keen cutting edges.

Oversize 7" wheels give greatly increased wheel life.

This grinder will quickly pay for itself by increased tool performance and life between grinds.

THOMAS PROSSER & SONS
120 WALL STREET NEW YORK

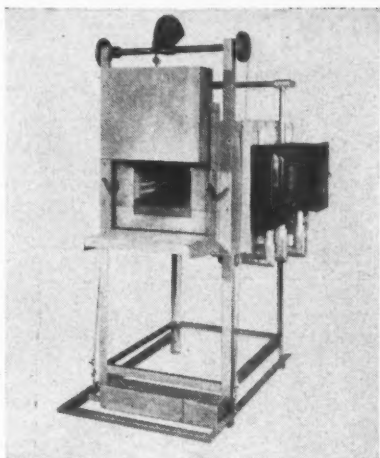
finite number of stable operating steps, thereby making smooth acceleration to any predetermined speed possible.

A complete line of standard Globe Dynamic Balancing Machines is available with which to accommodate weights from $\frac{3}{4}$ oz. to 25,000 lb. Each model is especially designed for laboratory precision for weights within its range. Unusual accuracy is assured by the sturdy, rugged design which also permits the machines to be used under continuous, heavy duty service.

"Falcon" Electric Box Type and Muffle Type Furnaces

H. O. Swoboda, Inc., 199 13th St., New Brighton, Pa., is now producing a line of "Falcon" Electric Box Type and Muffle Type Furnaces which have been found to be particularly well adapted to a wide range of both general and specific applications in either factories or laboratories. The furnaces are being used for testing metal samples, melting glass samples, burning refractories, oxidation determinations, testing vitreous enamels, heating high speed and similar steels in toolrooms, hardening

and tempering, and many other widely varying applications.



"Falcon" Type BRP Electric Box Type Furnace

Falcon Electric Box Type and Muffle Type Furnaces are arranged for either

CAN STILL BE MADE

Prosser HEAVY DUTY CARBIDE GRINDER

This machine has all the features of the smaller machine plus ample power for the heaviest tools.

- PROVISION FOR WET GRINDING.
- QUICK-ACTING INDEXING TABLES.
- HIGH GRADE BALL BEARING SPINDLE.
- DOUBLE V-BELT DRIVE.

Write for details of this and our other Carbide Grinders.



THOMAS PROSSER & SON
190 WALL STREET NEW YORK

ATLANTIC

NON-TEMPERING

TOOL STEEL

the New Steel Shape

OCTAGON

**THE SAFETY
STEEL**

This new steel shape furnishes a convenient, positive grip for chisels, punches, cutters and blacksmiths' tools.

This shape minimizes chipping and splintering.

Forging is simplified because there are no sharp corners to hammer into surface as on octagon and hexagon shapes.

Distinctive

Vacuum Grip

Safer

Write for complete details

ATLANTIC STEEL CO.

1775 BROADWAY, NEW YORK, N. Y.

Developers of Non-Tempering Tool Steel

floor or bench mounting and are equipped with heavy alloy heating elements to assure efficient, long-life operation at temperatures up to 2,300 deg. F. The heating elements are supported in high grade refractories arranged in the top, bottom, side, and rear walls of the furnace. The furnace chamber is completely surrounded by durable block-type insulation.

The model illustrated (Type BRP without muffle) has a chamber 9 in. high, 12 in. wide, and 36 in. deep, with a 16 kw. capacity suitable for 2,000 deg. F. maximum operating temperature. Automatic temperature controls are mounted on the side of the furnace and are completely wired for connection to power supply. The furnace is equipped with a foot-treadle operated door mechanism.

Falcon Box Type and Muffle Type Furnaces are made in various standard sizes and can also be supplied in special sizes according to specifications.

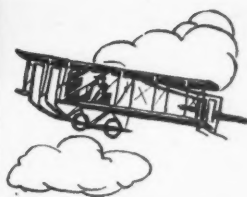
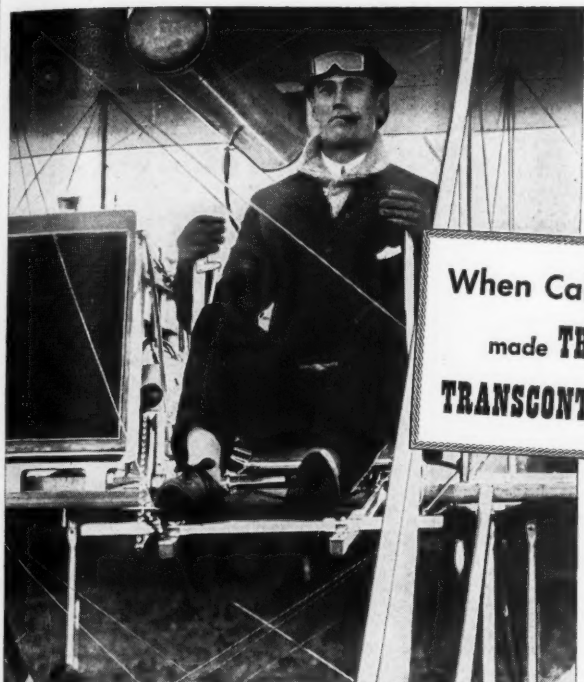
Wilson Model TW Transformer Arc Welder

The illustration shows the Model TW a.c. transformer arc welder which has been announced by Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York, N. Y. The welder is available in 300, 500, 750, and 1,000-ampere capacities.

The Model TW is a completely self-contained unit which is said to meet the heavy arc welding needs of shipyards, railroads, and steel mills, and is designed for operation on 220, 440, or 550 volts, 25 or 60 cycle current. When arranged for 220 and 440-volt operation, single phase, either voltage can be put into use by reconnecting the leads which are brought outside the unit. The welder has a wide range of current output, and continuous stepless current regulation is provided over the entire range by means of a hand crank located on top of the machine. The crank enables the operator to rapidly shift the setting of the welder as changes are made from one class of work to another.

The Model TW conforms to N.E.M.A. requirements. The divided construction of the coils is said to provide cool operation. All coil covering is spun glass fiber, heat-resistant, Class BB insulation, and is designed to provide trouble-free operation even if the welder is operated continuously at maximum settings.

On 60 cycle units, all sizes are fan-



When Calbraith P. Rogers
made **THE FIRST**
TRANSCONTINENTAL FLIGHT

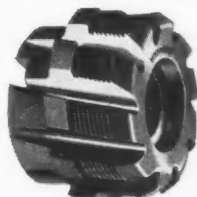
C. P. Rogers on Nov.
4, 1911, left New York
City in an airplane
and landed in Pasa-
dena, California 82
hours, 4 minutes later
—The First Trans-
continental Flight.

MIDWEST CUTTERS *BEGAN MAKING CHIPS FLY!*

TODAY THEY ARE MAKING THEM FLY FASTER THAN EVER

Midwest was founded on the premise, that customer relationship shall be more than simply supplying a product; that his particular cutting problem, studied and analyzed, and solved with tools designed and manufactured to fit the conditions, is rendering him an actual service.

These principles adhered to through the years, and the consistently high quality products furnished, we feel account for today's widespread use of Midwest Precision Metal Cutting Tools in all types of industry and in speeding up work for national defense.



SPECIAL FORM
MILLING CUTTER

MIDWEST TOOL & MFG. CO.

2360 WEST JEFFERSON AVE. • DETROIT, MICH.

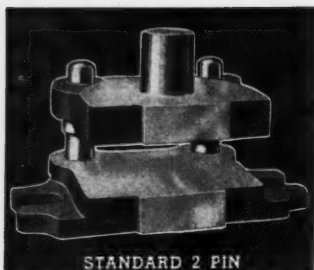
Precision METAL CUTTING TOOLS

REAMERS • MILLING CUTTERS • FORM TOOLS • CARBIDE TIPPED TOOLS • ADJUSTABLE HOLDERS

END MILLS • SLEEVES • COUNTERBORES • DRILLS • SPECIAL TOOLS

October, 1941

MODERN MACHINE SHOP 197



STANDARD 2 PIN

PRODUCTO DIE SETS

Three assembly and warehouse plants: Bridgeport, Conn.; Detroit, Mich., and Cleveland, Ohio. Large facilities at Detroit for manufacturing and shipping all catalogued and special die sets. Prompt shipments throughout the Middle West by motor truck.

Pacific Coast users can now obtain Producto Die Sets from stock at: Joseph C. Fletcher, 1415 Folsom St., San Francisco, Calif., and Frey Industrial Supply Co., 3828 Santa Fe Ave., Los Angeles, Calif.

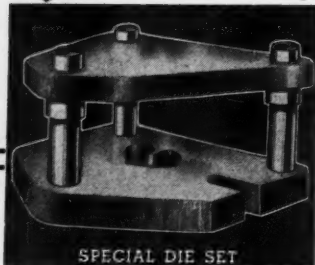
Ask for Catalog No. 9

The Producto Machine Co

990 HOUSATONIC AVE.
BRIDGEPORT, CONN.
3017 MEDBURY AVE.
DETROIT, MICHIGAN

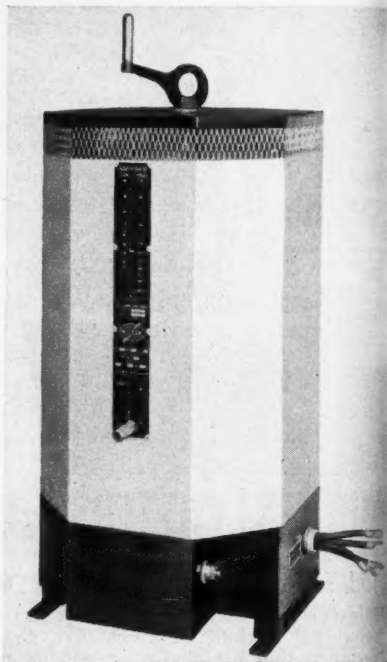


Manufacturers and Distributors of Producto Die Sets, Die Makers' Accessories, Dickerman Automatic Press Feeds



SPECIAL DIE SET

cooled except the 300-ampere size which is cooled by natural draft. On 25 cycle units, all sizes are fan-cooled. The 60 cycle units have high and low range switches, while the 25 cycle units have only one range. The low range switch provides current adjustments on the 500-ampere size from 40 to 650 amperes.



Wilson Model TW Transformer Arc Welder

Power factor correction is included in all models for 60 cycle operation except the 300-ampere size. Welders built for 25 cycle operation do not have power factor corrected. Efficiency of all the TW units is approximately 80 to 85 per cent.

"Hydra-Grip" Work-Holding Attachment

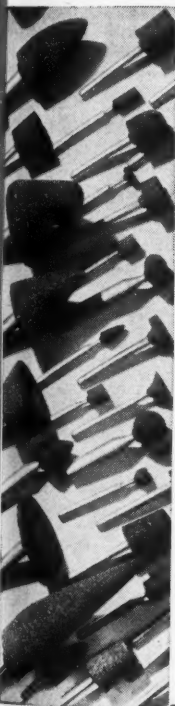
A hydraulic work-holding attachment for gang-chucking operations, to be known as "Hydra-Grip," has been introduced by Hydra, Inc., 417 S. Hill St.

size which
in 25 cycle
. The 0
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HI-POWER GRINDER

SPEEDS AMERICA'S PRODUCTION

For hundreds of difficult grinding jobs, nothing compares with the HI-POWER—a constant service tool that gives smooth, precision performance. Has ample power to drive a 2½" diam. wheel. 17,000 r.p.m. Wt. 3 lbs. In wood case, with accessories, \$38.50.



CHICAGO  MOUNTED
WHEELS

FIRST and FINEST

Actually cut grinding costs $\frac{1}{3}$ to $\frac{1}{2}$. Made of V/T Super Bond, the toughest bond made—will stand up under the most exacting conditions. Hold their shape and grind more pieces per wheel faster and without sacrifice to cutting action.

TEST WHEEL

Try one free. Tell us kind of job, grinder you use and size wheel preferred.

HANDEE TOOL OF 1001 USES

The little Caesar of grinders. Also drills, polishes, cuts, routs, carves, sands, saws, sharpens, engraves, etc. DeLuxe model 12 oz. 25,000 r.p.m. Fits any AC or DC socket. With 7 accessories, \$18.50.

Immediate Shipment

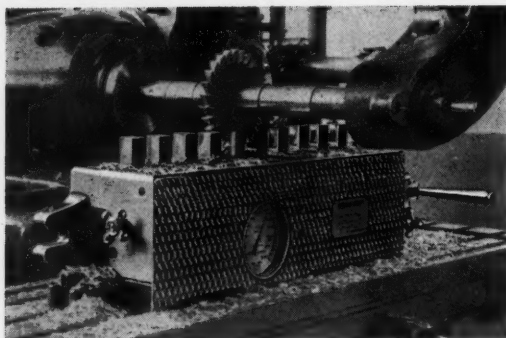
Send for the HI-POWER or the HANDEE
on 10 Days Trial.

CHICAGO WHEEL & MFG. CO.

Makers of Quality Products for 40 Years
1101 W. Monroe St., Dept. MM, Chicago, Ill.
Canadian Office: 1332 William St., Montreal.



Catalog of
Complete
Line on
Request



"Hydra-Grip" Work-Holding Attachment

Los Angeles, Cal. The attachment has interchangeable collets that hold 10 pieces of work in accurate alignment for precision machining on milling machines, shapers, grinders, or drill presses. The work is dropped into the collets and a few strokes of the hydraulic pump handle brings the controlled pressure to any point up to 4,000 pounds.

Use of the attachment reduces loading and unloading time to a minimum

and makes possible the machining of 10 pieces at one time. Alignment and height tolerances are held to standard specifications for precision work. According to the manufacturer, use of the Hydra-Grip Attachment multiplies the output of machine tools and releases machines for additional jobs.

Collets are available in a full range of sizes from $\frac{1}{4}$ to $1\frac{1}{2}$ in., by thirty-seconds, to hold round, square, or hexagonal stock. Special sizes or shapes are available on order. The controlled wrapping action of the collets ensures a firm grip on all 10 pieces, and the equalized hydraulic pressure holds all pieces uniformly, regardless of variations in size, within normal limits. Accurate control of pressure makes the Hydra-Grip Attachment particularly suitable for holding thin-walled or easily distorted work.

The Hydra-Grip is self-contained, without outside lines or connections, and in no way changes normal machining practice. The attachment is 25 in. long, $5\frac{1}{2}$ in. wide, and 6 in. high and weighs 125 lb. The housing is high

BRISTOL DIE GRINDER

A heavy-duty portable grinder for grinding die sections, rough castings, and trimming bar stock.

\$ 750.00
F. O. B.
DETROIT

With Motor and Abrasive Wheel

Capacity: 12" long, 7" high. Width of grinding face, 4". Tool, 8" x 22". Height to center of spindle, 38". 1 h.p. motor—1750 r.p.m.

BRADLEY MACHINERY CO.
211 JOS. CAMPAU ST. DETROIT, MICH.



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PROVE THE 25% SAVING OF THIS SENSATIONAL BLADE

**SPEND ONLY \$1 OR \$2
START TO SAVE HUNDREDS**



Two edges, faster and deeper cuts, no shattering, 25% or more savings . . . that's the amazing headline story of the new DOUBLE-LIFE high-speed blade. Now in the hands of key distributors everywhere, this blade is ready to prove its value on your own work . . . prove that its special set differential eliminates drag and wear on the trailing edge . . . prove that its special heat treatment, leaving edges hard and ends and center soft, makes it super tough. Costing only 50% more than Blu-Mol single edge, DOUBLE-LIFE does 100% more work — a minimum saving of 25% . . . more when you change over from other blades. An old dream, yes . . . and now it's come true!

LET US ARRANGE A DEMONSTRATION . . .

The DOUBLE-LIFE distributor in your territory will be glad to sell you one or two blades for your own test. Or he'll give you a demonstration without charge or obligation. Wire, phone or write Millers Falls Company today. We'll make the date for you.

DOUBLE-LIFE *Hack Saws*



DEVELOPED • PERFECTED • MANUFACTURED ONLY BY
MILLERS FALLS COMPANY
GREENFIELD, MASSACHUSETTS • U.S.A.

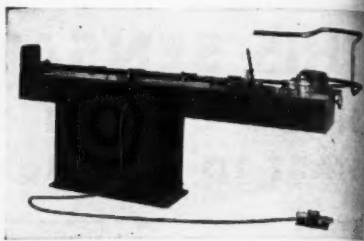
quality Meehanite, normalized to minimize distortion. Collets are of special steel, ground to close tolerances. Chevron packings are used throughout to ensure against pressure leakage.

Pines Series 200 Air-Operated Tube Bender

The Pines Engineering Co., 123 Main St., Batavia, Ill., has developed a high production, air-operated tube bender, designated as the Series 200, which is said to be capable of producing an average of 250 bends per hour on 1-in. 16-gauge tube using a mandrel. The mandrel, which assures smooth bends, is available with either a mechanical or air-operated device for pulling the mandrel out of a bent tube in the event it becomes stuck.

One complete set of bending dies of a specified size is included as standard equipment of the machine. The dies are actuated by the piston rod of an air cylinder, specially constructed for this service. The air cylinder is controlled by a solenoid-operated poppet-type four-way air valve directly connected to the cylinder. This arrange-

ment makes possible very short set-up times and reduces to a minimum the amount of air required for operation. The solenoid valve is controlled by the



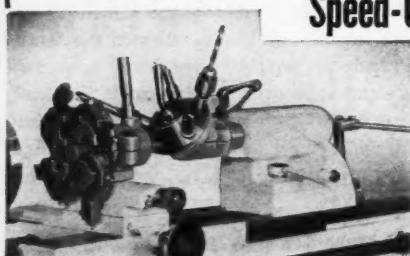
Pines Series 200 Air-Operated Tube Bender

operator through either a foot switch on the floor or a conveniently located push-button switch on the machine.

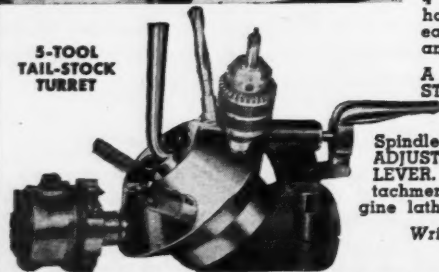
The Pines Series 200 Bender has an arc welded plate steel frame on which the dies and mandrel are mounted. The operating mechanism is located inside the frame and is readily accessible through a removable plate. The frame is designed with a small, but stable pedestal, the overhanging top portion

Speed-Up Production — Lower Costs

CONVERT your Engine Lathe into a Turret Lathe in 15 Seconds



5-TOOL
TAIL-STOCK
TURRET



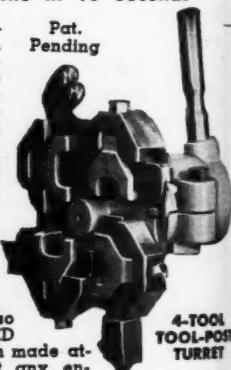
A 4-Tool TOOL-POST TURRET. Two sizes designed to increase production on engine lathes. Easily mounted on cross slide or compound rest. Holds 4 standard tool holders. Can be easily inserted and rigidly held.

A 5-Tool TAIL-STOCK TURRET, easily mounted on Tail-stock

Spindle — 4-sizes. Also ADJUSTABLE PULL-FEED LEVER. These precision made attachments will convert any engine lathe into a production turret lathe.

Write for bulletin of these and other JEFFERSON TOOLS.

Pat.
Pending



4-TOOL
TOOL-POST
TURRET

JEFFERSON MACHINE TOOL CO., 750 WEST FOURTH STREET, CINCINNATI, OHIO

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As steel orders run, that one was pretty small—in fact, one small bar, weighing but a few pounds, would be plenty.

But its physical properties were sharply specified—so, as far as Columbus, Ohio, was concerned, that particular steel might as well have been platinum.

But the manufacturer had pleasantly discovered that his Mill Supply Salesman could also qualify as a sleuth when needed. So he was delighted but not sur-

prised when, after a few days, the salesman reported "Your steel is on the way—we found a stock in Scranton."

Have you "discovered" your Mill Supply Distributors in their capacity of helping you to locate supplies of vital materials? This is but a part of the indispensable services they render in both your buying and your selling. "Cleveland" Tools are marketed through Distributors exclusively.

We favor adequate Preparedness for National Defense

The **CLEVELAND** **CLEVELAND** **TWIST DRILL COMPANY**
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"CLEVELAND" DISTRIBUTORS EVERYWHERE ARE READY TO SERVE YOU

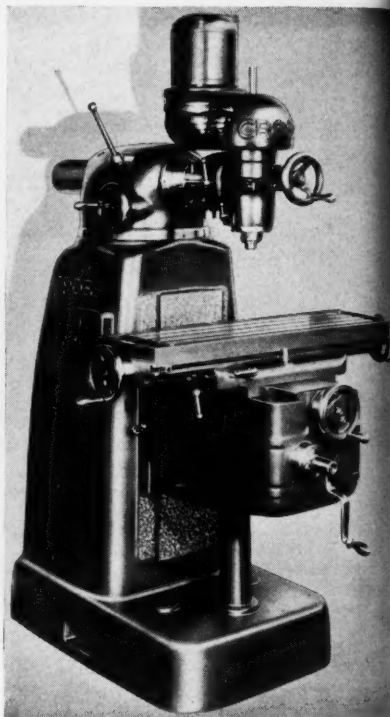
providing for the bending of intricate shapes which can be swung under the frame if necessary.

The Pines Series 200 Bender has a capacity for $\frac{3}{8}$ to 1 $\frac{1}{2}$ -in. O.D. soft annealed copper or aluminum alloy tubing and $\frac{3}{8}$ to 1-in. O.D. 16-gauge soft steel tubing. The machine occupies a floor space of 10 ft. long x 18 in. wide, and weighs approximately 1,500 pounds.

Cross No. 20 Universal Milling Machine

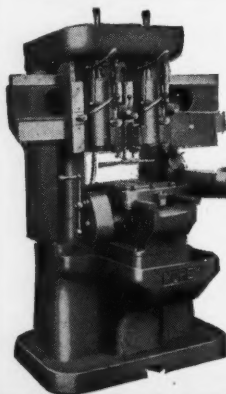
Shown herewith is the Cross No. 20 Universal Milling Machine which has been brought out by the Cross Gear & Machine Co., 3250 Bellevue Ave., Detroit, Mich. The machine has a pyramidal column of generous proportions and unusual rigidity, with uniform section, uninterrupted contour, and total absence of openings.

The outstanding feature of the machine is the cutter spindle which can be adjusted to any angle in any plane, thereby enabling an entire series of operations to be completed with minimum handling of the work. For example, the machine can be arranged to mill



Cross No. 20 Universal Milling Machine

MOREY No. 12M HIGH SPEED VERTICAL PROFILER and MILLER



Production of interchangeable parts requiring milling of any contour or outline can be materially speeded up by this Profiling and Milling Machine.

Ask for
Circular
No. 680-A

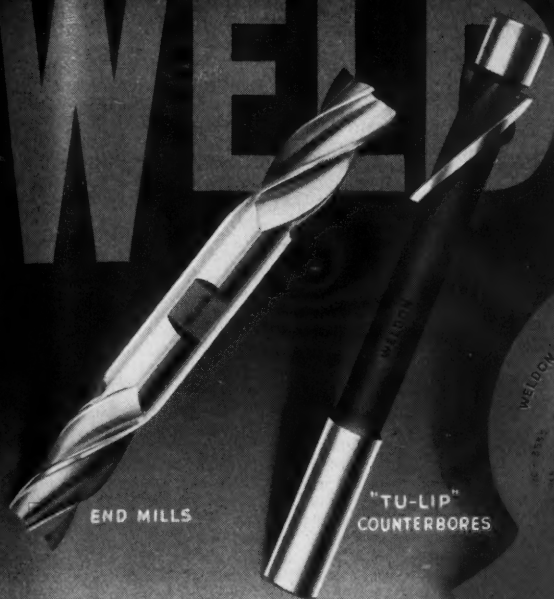
MOREY MACHINERY CO., INC.
410 Broome Street New York, N.Y.

vertically, drill at an angle, jig bore at another compound angle, spot-face at a third angle, and finally sink a horizontal keyway without ever moving or resetting the work.

Additional features include large dials accurately calibrated and marked for easy reading, built-in finger tip control for right or left-hand spindle rotation, motorized power feed attachment with adjustable dogs and automatic stop for the table, self-contained coolant system with motorized centrifugal pump mounted on tank in the base, $\frac{1}{2}$ h.p. spindle motor, direct reading spindle dial, overarm adjustment to provide extra horizontal range for cutter spindle, graduated quadrants for making angular settings, and precision anti-friction bearings to retain the spindle in an alloy steel quill which is accurately threaded to receive a worm gear adjusting nut.

Specifications of the Cross No. 20 Universal Milling Machine are as follows:

WELDON



END MILLS

"TU-LIP"
COUNTERBORES

GROUND
FORM
TOOLS

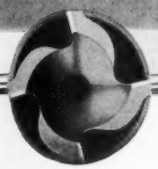


CAM SERVICE
FOR B&S SCREW
MACHINES



"Yesterday's Pioneers"

"Today's Leaders"



These and many other tools are our contribution to the vital defense program now under way.

We are doing our utmost to produce tools in quantities ample to serve your production schedules—but never will Weldon quality be sacrificed despite the tremendous demand for quantity.

Weldon tools will not "let you down" in your efforts to do a share in our country's defense.

Write for Catalog No. 8

The WELDON TOOL Co.
3000 WOODHILL RD. CLEVELAND, OHIO

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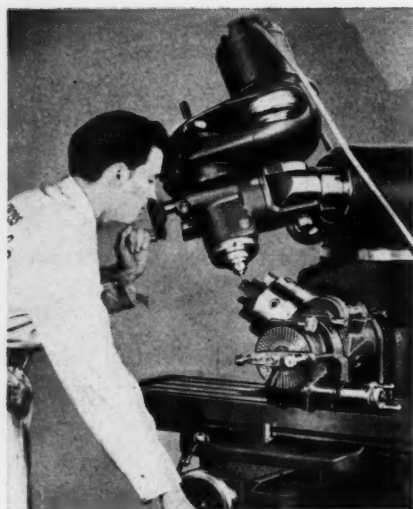


Illustration showing Cross No. 20 Universal Milling Machine arranged for performing compound angle jig boring operation

table, overall, $10\frac{1}{2}$ x 36 in.; table working surface, $10\frac{1}{2}$ x 36 in.; longitudinal travel, 20 in.; cross travel, 9 in.; vertical knee travel, $16\frac{1}{2}$ in.; spindle nose to table top, maximum $16\frac{1}{2}$ in., minimum 0 in.; spindle quill travel, 4 in.; spindle taper (standard), No. 3 Morse; head adjustment by extending overarm, 12 in.; throat, maximum, $19\frac{1}{8}$ in.; minimum, $7\frac{1}{8}$ in.; standard spindle speeds, with 1,200 r.p.m. motor, 350, 570, 890, 1,510, 2,360, and 3,880 r.p.m.; with 1,800 r.p.m. motor, 520, 855, 1,335, 2,265, 3,540, and 5,830 r.p.m.; net weight, 1,750 pounds.

Lincoln "Type G" Improved Arc Welder Control Box

Further improvement in Dual Continuous Control for arc welding, in the form of a welder control box of advanced design and construction, is announced by The Lincoln Electric Co., Cleveland, Ohio. Enhancing the benefits of Dual Continuous Control, the box, which is designated as the "Type G," is said to prevent accidental contact with live parts, increase accessibility, permit wiring with flexible or rigid conduit or rubber-covered multiple-conductor cable, and eliminate dangers arising from unintentional loosening of the lifting hook.

The box has a separate compartment for all a.c. circuits, including push button, and another separate compartment for d.c. terminals. Both compartments have a snap catch which holds the door in closed position. The a.c. compartment door also has screws for locking to prevent any unauthorized person from opening the compartment and touching live parts. The catch, however, holds the door in closed position in case the screws should accidentally or temporarily be left out of their proper places. On the d.c. compartment, the snap catch feature of the door makes the terminals readily accessible without the use of tools and, at the same time, provides a complete cover for the terminals when the door is closed.

Another important feature of the Type G control box is the improved design and construction of the lifting hook which are said to eliminate all danger of the hook being unscrewed unintentionally and becoming a hazard. The hook is made from round stock bent to the form of a loop which is arc welded to the sub-panel of the control box on one end and looped over a cap screw on the other. The cap screw is fastened

WHITNEY-JENSEN BRAKES

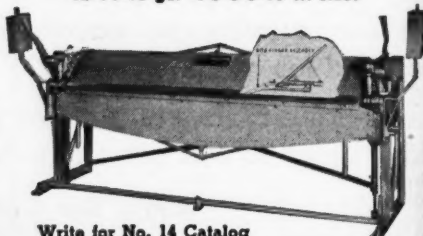
FOR LONG LIFE AND ACCURACY

ROLLER BEARING. Improved design is 40% faster and 20% easier on the operator. Hardened jaws for stainless steel. Combination type for plain or box and pan bending.

WHITNEY METAL TOOL CO.

110 Forbes Street Rockford, Illinois

12-14-16 ga. 4-5-6-8-10 ft. sizes



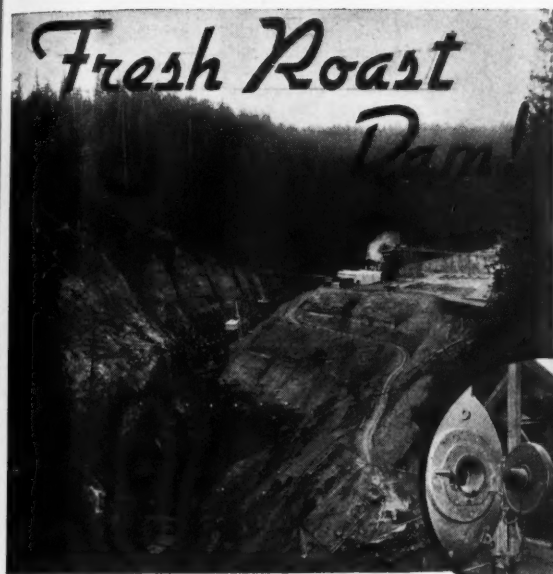
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RAY OIL-BURNERS equipped with McGILL Bearings

are operating twenty-four hours a day to roast 425,000 cubic yards of dirt fill which will form a water-tight bulkhead to block the canyon.

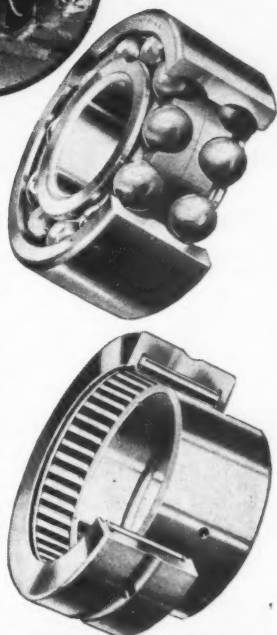
Dam Engineers say: the earth packs tightest when moisture content is exactly 10% and Ray Oil-Burner Engineers say that McGILL Precision Ball Bearings have contributed more than a little to the long, trouble-free operation which has made Ray Oil-Burners the first choice of Business and Industry for 27 consecutive years.

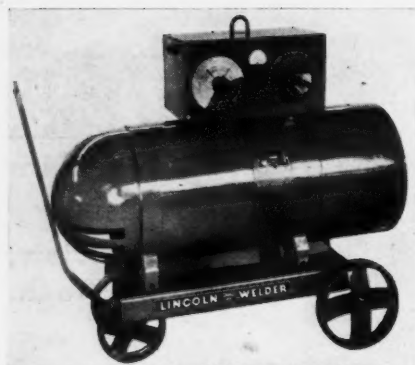
McGILL Ball and Roller Bearings are made in a wide variety of types and sizes. They are built to handle satisfactorily the specific job they are designed for. Installations through many years have proved their worth. Why not investigate McGILL Bearings for your use? Write for Catalog.

BEARING DIVISION



MANUFACTURING COMPANY
1500 North Lafayette Street
VALPARAISO, INDIANA





Lincoln "Type G" Control Box Mounted on 300-Ampere Portable Motor-Driven Welder

into an angle piece which is arc welded to the frame.

Special non-shorting lugs, which lock themselves in proper position before they can be bolted to the input terminals of the starter, are said to prevent the possibility of blowing up the input lines due to shorted input lugs caused by careless maintenance.

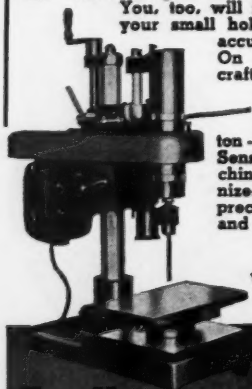
MAXI-JR.-E.

Super Sensitive Drilling Machine

Customers on sending in repeat orders tell us, "We want your machine—it's 'Tops'."

You, too, will find it "tops" on your small hole drilling where accuracy is essential.

On instrument, aircraft, Diesel, and any other type of precision drilling, the Hamilton-Muehlmann Super Sensitive Drilling Machines have a recognized superiority in precision, sensitivity, and economy.



Write for catalog.

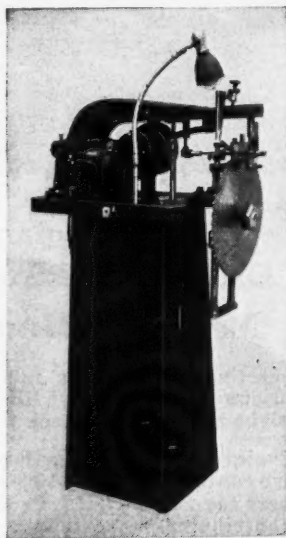
THE HAMILTON TOOL CO.
HAMILTON, N.Y.

The control box is permanently grounded to the motor and generator frame through the mounting bolts. This feature enables both the control box and the machine to be grounded by simply grounding the conduit which leads to the box.

An additional feature of the Type G box is a lead clamp which prevents the output studs from bending or becoming damaged when the welder leads are accidentally jerked or pulled.

Redesigned "Quick Way" Universal Automatic Saw Filing Machine

The Industrial Engineering Co., Inc., 311 6th Ave. S., P. O. Box 433, Minneapolis, Minn., is now marketing the re-



Redesigned "Quick Way" Universal Automatic Saw Filing Machine

designed "Quick Way" Universal Automatic Saw Filing Machine shown in the illustration. According to the manufacturer, the number of moving parts has been reduced by more than 50 per cent. At the same time, the machine has been simplified and made sturdier to prolong the rigidity and fine accuracy of the unit. The parts of the machine are unusually massive and strong and all bearings and bearing surfaces are oversized. Moving parts are of hard-

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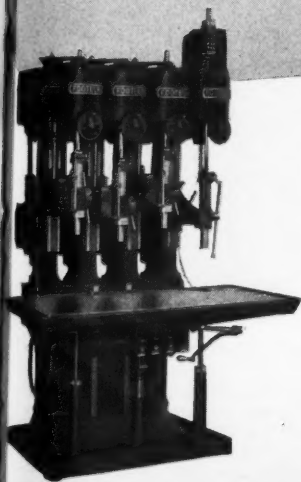
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FOR

Faster Sensitive DRILLING



• Correct speeds for all operations with rigidity and accuracy that will let you use your tools to their full cutting capacity mean faster drilling on your defense work.

The No. 2 size with back gear unit can be furnished with speeds from 185 R. P. M. to 2300 R. P. M. or from 275 R. P. M. to 3450 R. P. M. These ranges make it possible to counterbore in tool steel or drill small holes in aluminum.

Early deliveries still possible on some sizes.

THE FOOTE-BURT COMPANY
CLEVELAND, OHIO

Detroit Office: 4-253 General Motors Building

FOOTBURT

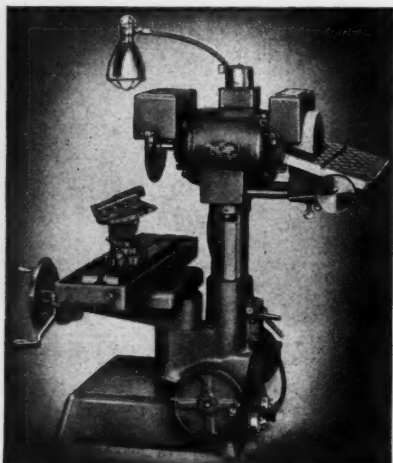
Sensitive
DRILLING MACHINES

ened steel or other wear-resisting material, and the essential moving parts are enclosed.

To provide massive rigidity in the filing stroke, the filing arm has been increased in weight to 45 lb. The filing arm is mounted on two bearings that are 1 1/4 in. in diameter and are spread 11 in. apart to hold the arm rigid against any possible side thrust.

One of the outstanding features of the redesigned machine is the speed reducer motor. By means of this motor, vibration, looseness, and slippage due to the presence of belts, pulleys, or shafts are said to be eliminated.

CARBIDE TOOL GRINDER



This New Carbide Tool Grinder has a wider, longer table of much greater longitudinal movement. It is designed for complete maintenance of cemented carbide tipped tools; for many manufacturing processes, too.

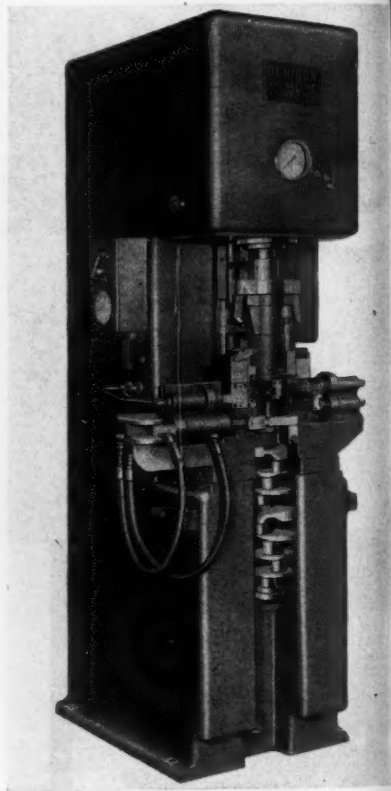
(Pin this to your letterhead and send it to us; we'll do the rest!)

Please send us your new bulletin CTG41-10M with full details and prices on your Carbide Tool Grinder.

K. O. LEE COMPANY
Aberdeen, South Dakota

Denison Hydroilic Crankshaft Assembly Press

A press for assembling keys and timing gears on automobile crankshafts designated as the Denison Hydroilic Crankshaft Assembly Press, is now being built by The Denison Engineering



Denison Hydroilic Crankshaft Assembly Press

Co., 103 W. Chestnut St., Columbus, Ohio. The press is of 5-ton capacity and is entirely automatic.

In use, a crankshaft is locked in place and keys are fed into the press through magazines. Four cylinders assemble the two keys required on the shaft and the timing gear is pressed into place by the ram. A special safety feature halts the operation of the ram if the keys are not pressed into place properly. The equipment is also ar-

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Ask us to show you how the **SHORT WAY** will save time and cost on your hollow milling jobs.

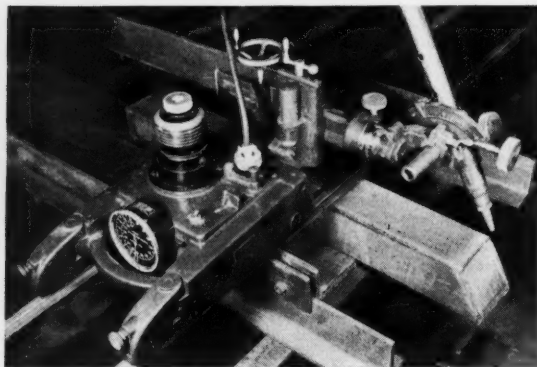
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ACME GRIDLEY 4-B AND 8 SPINDLE BAR AND CHUCKING AUTOMATICS • SINGLE SPINDLE AUTOMATICS • AUTOMATIC THREADING DIES AND TAPS • SCREW MACHINE PRODUCTS • THE CHRONOLOG • LIMIT SWITCHES • POSITIVE CENTRIFUGE • CONTRACT MANUFACTURING

ranged so that if the timing gear does not fit, the piece is rejected.

Airco Protractor-Type Torch Holder

Added convenience and accuracy in setting Radiograph cutting torches for any desired angle of cut is now made



Airco Protractor-Type Torch Holder

possible by the Airco Protractor-Type Torch Holder shown herewith, product of the Air Reduction Sales Co., 60 E. 42nd St., New York, N. Y. As an example of the type of work for which the accuracy and time-saving features of the holder are particularly adaptable, a bevel cut billet is shown in the illustration. A circular knurled knob permits angular adjustment, as shown on the scale.

The holder, which has a 90-deg. angle range, can be attached to any standard Airco Radiagraph.

Hobart "Aircraft Special" Arc Welder

Hobart Bros. Co., Troy, Ohio, has introduced a specially designed arc welder for aircraft construction purposes to be known as the "Aircraft Special." Although the unit embodies the same design and operating speed (1,750 r.p.m.) as other Hobart Multi-Range Arc Welders, it has been modified to give the "quick, hot start" required in the efficient welding of light gauge alloy tubular members in airplane construction. The unit also provides a lower range of welding current specified from 10 to 150 amperes at normal welding voltage.

The Hobart Aircraft Special Arc Welder is designed for the welding of all light gauge metals that can be welded by an electric arc, especially the welding of X-4130 chrome molybdenum steel on aircraft engine mounts. This type of welder has also been used with unusual success in a large shipyard where stainless steel trimming bands only 0.030 in. in thickness were welded during the installation of galley equipment in several ships.

The Aircraft Special is said to weld especially well with coated electrodes of $\frac{1}{8}$ to $\frac{1}{4}$ in. in size without burning through and with steady progress along the seam due to the "soft arc" that "hangs on" even under low current conditions. Dual control of the welding current and open circuit voltage enables the operator to select exactly the right volt-ampere combination for each job. Remote control, which is standard equipment of the welder, permits the

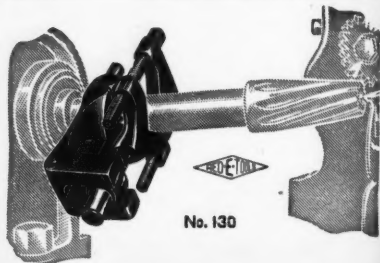
CORRECT SPACING ASSURED

... on straight, spiral or taper work—because ball and socket, sliding member eliminates lost motion. No binding or cramping. Perfect work assured.

WRITE FOR CATALOG S-41.

THE READY TOOL CO.

510 IRANISTAN AVE. BRIDGEPORT, CONN.



AMMCO 6" SHAPER

"A precision machine of a thousand uses"



- - - IT'S PORTABLE - - -

Saves Steps and Time

Don't tie up a big shaper when so many jobs can be done just as accurately and much quicker on the AMMCO 6" PRECISION SHAPER... Available for stationary installation or mounted on portable cabinet easily rolled to the mechanic's workbench.

Features of this Shaper include quick adjustment of stroke, ram position, tool head, table height, table support, feed

and speed... The maximum length of stroke is $7\frac{1}{4}$ "... Table has five cross feeds (reversible)... Countershaft has three-step cone pulley... $1/4$ or $1/3$ H.P. Motor.

Manufactured by an organization having years of experience in producing precision machinery... Recommended by leading manufacturers and machine tool dealers.

Write for Specifications and Prices.

AUTOMOTIVE MAINTENANCE MACHINERY CO.
2104 Commonwealth Avenue **North Chicago, Ill.**



Hobart "Aircraft Special" Arc Welder

operator to make slight heat adjustments after the "hot start" without returning to the welding machine.

The welder is of the Hobart Multi-Range type with four laminated main poles and four interpoles. The machine

is 28½ in. high and 17 in. wide (over all measurements of stationary model), and is furnished with convenient links for voltage change-over from 220 to 440 volts or vice versa. The machine is also supplied for 550 volts and special voltages, and can be obtained in either a stationary or portable model. Portable models are available with steel wheels or balloon or hard rubber tires.

R & M F-½ Steel Hoist

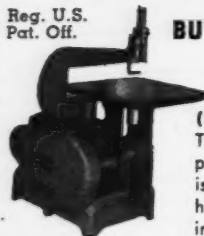
To provide efficient, low-cost material handling for all types of industry, Robbins & Myers, Inc., Springfield, Ohio, has developed a new type steel hoist to be known as the F-½. The hoist, which is unusually compact, is built in 1,000 and 2,000-lb. capacities and is designed to occupy minimum of headroom space with maximum lift power. All gears and shafting are made of alloy steel with approximately 278,000 lb. per sq. in. of tensile strength. The main frame is of welded steel plate.

Both the 1,000 and 2,000-lb. capacity hoists are powered by an R & M high-torque hoist motor. Control is by means of a push-button pendant with single or two speeds for polyphase alternating

MODEL No. 16 "SPECIAL"

Constructed as per Specifications of
U. S. Naval Aircraft Factories

Reg. U.S.
Pat. Off.



BUTTERFLY FILING and SAWING MACHINE

(Die Making Machine)

This is a very heavy, powerful machine and is designed for extra heavy filing and sawing, but it performs small work just as well.

This type of machine is usually adopted in

Beware of Imitations!
Our machine carries the
Butterfly trade mark.

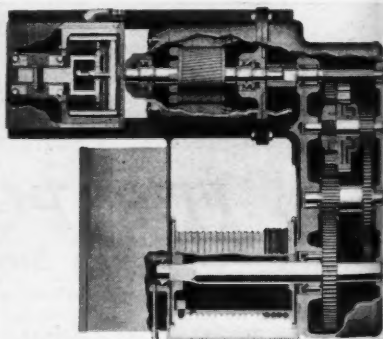
Ammunition Plants, Airplane Factories and machine shops where heavy and precision filing and sawing is desired. We also manufacture smaller models—Model D—10" Table; Model No. E.L.—12" Table.

HARVEY MANUFACTURING CORP.

163 Grand St.,

New York

Phone: CAnal 6-5170



Sectional View of R & M F-½ Steel Hoist

current. Provision is also made for 110-220 single-phase current.

A load brake, incorporated in the hoisting gears, automatically controls the speed when the load is lowered. If the power fails, the brake is said to prevent the load from dropping. The brake is oversize and is designed to operate for a long length of time without adjustment or wear. The hoist drum

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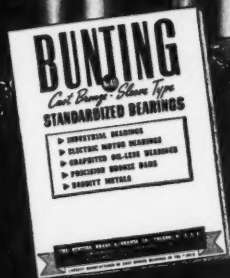
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This 64-page Bunting catalog gives specification data on many hundreds of stock Bearings and Bars you can get without delay.

- For all kinds of industrial machinery.
- For machine tools.
- For all makes and sizes of electric motors.
- Tubular and Solid Bars of Bearing Bronze finished I. D., O. D. and Ends. Hundreds of sizes.

- Write for this catalog of ready to ship, completely finished bronze bearings.

THE BUNTING BRASS & BRONZE COMPANY

TOLEDO, OHIO

Warehouses in All Principal Cities

BUNTING

BRONZE BUSHINGS • BEARINGS
PRECISION BRONZE BARS • BABBITT METALS



October, 1941

MODERN MACHINE SHOP 215

is fabricated from steel pipe and steel flanges and is jig welded and machined. The entire lift of the hoist can be obtained without overwind of the cable.

The R & M F- $\frac{1}{2}$ Steel Hoist can be applied to any make of monorail. Motor-driven trolleys with speeds of 60 to 100 ft. per minute at single speed and with push button can be provided. Shipping weight of the 2,000-lb. hoist is 440 pounds.

South Bend 48 x 96-In. Surface Plate

Illustrated herewith is a 48 x 96-in. surface plate which is now being manufactured by the South Bend Tool & Die Co., 2600 S. Main St., South Bend, Ind. Cast in semi-steel and finished plane within 0.005 in., this large surface plate offers seven specific support-points for utmost flexibility in usefulness.

Two sizes of adjustable blocks or legs (10 and 12 in.) provide possible working-surface heights between 29 and 33 in. The blocks support threaded $1\frac{1}{2}$ -in. screws, each topped with a circular cap which is recessed to receive any of the projecting support-points on the bottom of the plate. A 12-pitch thread provides fine adjustment to compensate for floor irregularities, and so on. Five blocks are provided with each surface plate.

The ribbed underside of the plate is designed to provide maximum strength without excessive weight. The surface plate weighs 3 tons. The underside of the plate is painted red, the blocks green.

Originally made by the company for use in its own factories, the surface plate is now offered as a standardized product for machine shops, tool and die-makers, and large toolrooms.



South Bend 48 x 96-In. Surface Plate

Progressive Deep-Throat Welder

To facilitate resistance spot welding inside of deep assemblies such as tanks of various types, barrels, and so on, Progressive Welder Co., 3023 E. Outer Drive, Detroit, Mich., has introduced a deep-throat welder of the type shown in the accompanying illustration. The welder has a lower arm built of heavy tubing and fitted with a replaceable adaptor for the lower electrode. This construction, due to its inherent rigidity, eliminates the necessity of supporting the lower arm by means of braces, thereby enabling deep assemblies to be slid over the arm to full throat depth. The lower arm is adjustable for height.

The upper arm, carrying the upper electrode and gun assembly, is braced in the conventional manner. Both the upper and lower arm are designed so that they may be adjusted in or out to increase or decrease throat depth as may be required.

To weld a piece of equipment such



ASK FOR
CIRCULAR
No. 713

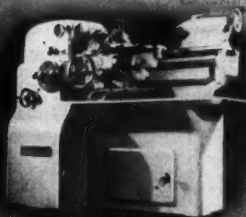
The "27" MOREY Semi-Automatic Heavy Duty LATHE

JUST THE MACHINE FOR SHELL WORK!

Suitable for rough or finished turning shells at maximum feed. • Put your shell operations on this fast, powerful lathe and turn out your work at top speed up to the limit of tool capacity. • Multiple tool holders can be supplied at front and rear; a turret mounted on separate saddle can be used instead of tailstock. • Full use of carbide tools can be taken by this heavy duty lathe.

MOREY MACHINERY CO., INC.
410 Broome Street New York, N.Y.

PRECISION maintained!



"MONARCH" LATHE—Metered feed to ways, cross slide, apron bearings . . .

● High standards of machine accuracy, versatility and speed become of maximum value only when they are **MAINTAINED**. Bijur-lubricated machines are protected for life! Bearings, slides, gears . . . to each Bijur-fed

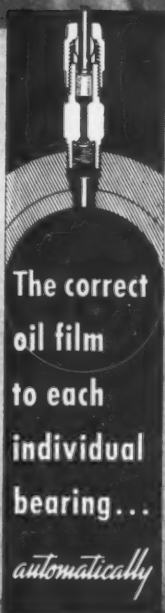
part goes the metered oil-film it individually needs. Automatically! For a day's bigger output of higher quality work . . . for savings on maintenance . . . standardize on **BIJUR**.

BIJUR LUBRICATING CORPORATION, Long Island City, New York

1330

BIJUR

AUTOMATICALLY *Correct* LUBRICATION



The correct
oil film
to each
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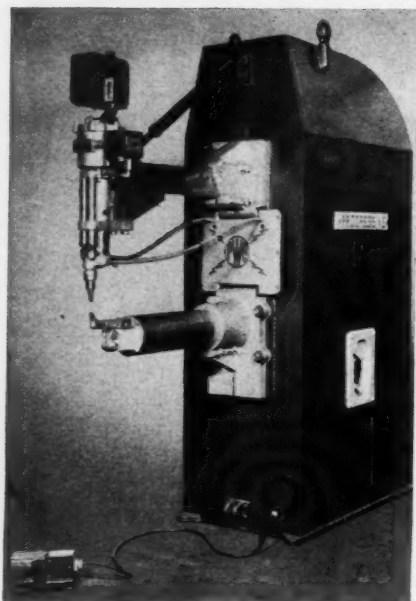
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Progressive 75 KVA Deep-Throat Welder

as a cylindrical tank, the tank is slipped over the lower arm to the desired location for welding, the tank resting on the lower electrode. Pressing the control actuates the hydraulic welding gun, bringing the upper electrode down against the work to be welded and initiating the weld cycle.

Features of the Progressive Deep-Throat Welder include elimination of flexible shunts, positive hydraulic or air-hydraulic pressure at the electrodes, non-magnetic head construction to reduce induction losses, straight-line

movement of the upper electrode, provision of non-flicker pressure switch, positive cooling circulation, and so on.

The deep-throat welder is available in standard capacities of 75 and 150 kva. Other capacities are available on special order.

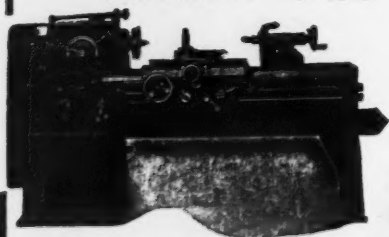
"Dudco" Vane Type Variable Delivery Pump

An infinitely variable delivery hydraulic pump of dual vane design is announced by the Detroit Universal Duplicator Co., 253 St. Aubin, Detroit, Mich. Designated as the "Dudco" and designed for continuous operation at high pressures, the pump is recommended for use where the possibility of line surges requires a "break-proof" pump. Delivery is infinitely variable over two ranges; namely, 4 to 0 gal. per minute and 8 to 0 gal. per minute.

The Dudco Pump is recommended for continuous duty operation at 1,250 lb. per sq. in. pressures but can also be used where periodic pressures range as high as 2,000 lb. per sq. in. The rate of delivery is increased or decreased by means of an adjustment screw which can be adjusted while the pump is in operation.

The high operating efficiencies and almost perfect balance of the pump, which are said to reduce wear and eliminate all possibility of overheating, are maintained due to the design of the vanes, which are of a dual type. Each vane is bevelled around the entire edge so that oil from the oil hole in the rotor can flow around all the edges of the dual vanes. In this manner, a "back" pressure, variable to suit individual requirements, can be exerted on the vanes from the stator side. Thus, each set of vanes is held against the stator with only a portion of the total operating

THE NEW "C & J" 15" AND 16" LATHES



12 Speed Geared Head Motor Drive
Timken Mounted Spindle
Modern Design—liberal dimensions

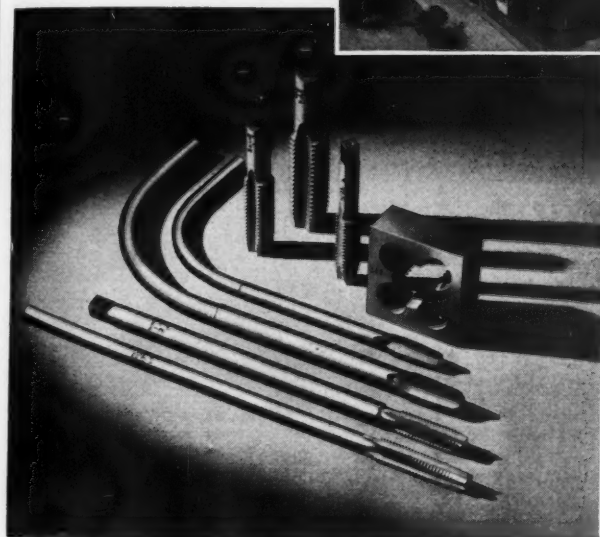
Write for Bulletin

THE CARROLL & JAMIESON MACHINE TOOL CO.
BATAVIA OHIO, U. S. A.

IN DEFENSE PRODUCTION

WITH WINTER

TAPS



• Your tapping Costs will be less with **WINTER QUALITY TAPS** on the job. Their rapid and uniform cutting action insures smooth threads and accurate assembly fit.

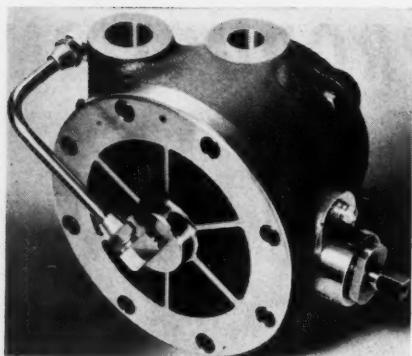
Skillfully made taps for today's excessive demands.



WINTER BROTHERS CO.

MAIN FACTORY—WRENTHAM, MASS. • BRANCH FACTORY—DETROIT, MICH.

A Division of the **NATIONAL TWIST DRILL & TOOL COMPANY**
DETROIT, MICHIGAN



"Dudco" Vane Type Variable Delivery Pump

pressure of the pump, thereby eliminating the possibility of overheating the vanes and reducing wear to a minimum. The bevelling also serves to hold the vanes "centrally" with respect to the housing, thus reducing housing wear.

Another feature of the pump is the method by which the split stator is arranged so that either or both halves can be moved to increase or decrease the delivery rate.

U. S. HEADS

STANDARD SINCE 1915



Two Spindle Head
Both Spindles
Adjustable

The United States Drill Head Co.

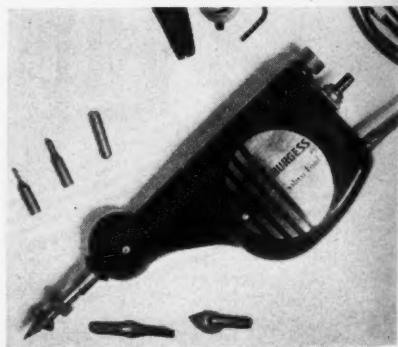
1954 Riverside Drive
CINCINNATI, OHIO

The housing of the Dudco Pump is designed for flange mounting, with adjustment screws at opposite sides. Intake and output connections are located at the top. Any oil leakage from the inside of the pump into the outer part of the housing is returned to the intake through a return line. Vanes, rotor, and stator halves are of hardened and ground steel, as is the splined drive shaft.

Burgess "Vibro-Tool"

A versatile tool operating on the vibrating principle and designed for use in the engraving, cutting, hammering, or carving of metal, wood, sheet rubber, sheet cork, glass, ceramics, and other materials, to be known as the "Vibro-Tool," has been placed on the market by Burgess Handicraft Supplies, 180 N. Wabash Ave., Chicago, Ill. The tool operates at 7,200 strokes per minute, with the stroke adjustable up to $\frac{1}{8}$ in. The uniquely designed chuck easily grips a large variety of engraving needles, cutting knives, gages, and hammers.

The Burgess Vibro-Tool is designed for continuous operation and is said to remain cool when operated continuous-



Burgess "Vibro-Tool"

ly. A comfortable ball grip permits ease in handling and accurate control by the operator. The tool can be used with jigs or fixtures to cut or engrave to a template.

Accessories available include fine and coarse needles for engraving, tungsten-tipped needles for cutting or engraving glass or ceramic materials, knife

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er, 1941

WHAT'S A DILEMMA, JOE?



"Gosh, Bill, we've got one right here in the shop."

"How's that?"

"Well, here we are, chock-full of defense orders, and trying our darndest to squeeze in some files for our old-time customers. There's a dilemma for you."

"I'll bet we could make a lot more files if we cut a few corners."

"Sure we could, but the boss keeps saying, 'Only the best are good enough' and won't let us do anything else but make 'em that way."

"He's probably right at that. But with the war industries requiring so many of our files it leaves darn few for others to buy."

"Yes, it's a dilemma all right. I hope the folks that have to wait a few extra weeks for their files will realize we're doing the best we can and will be patient."

"American-Swiss" Swiss-Pattern Files are available in over 3000 shapes, cuts and sizes . . . made in U.S.A.



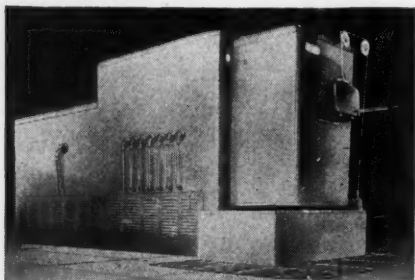
AMERICAN SWISS FILE & TOOL CO. • ELIZABETH, NEW JERSEY

American Swiss
SWISS-PATTERN FILES

blades, hammer tips, special cutters, and foot gage for controlling the depth of cut.

"Lithcarb" Atmosphere Furnace

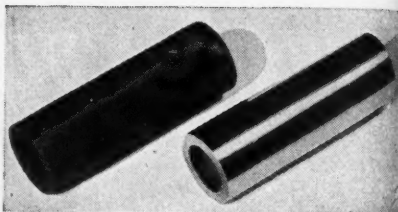
Shown herewith is the "Lithcarb" Atmosphere Furnace which has been brought out by the Lithium Corporation, Raymond-Commerce Bldg., Newark, N. J. The furnace embodies the use of a Lithco compound which is said to completely neutralize scaling and de-



"Lithcarb" Atmosphere Furnace

carburizing reactions and provide fast, bright, gas-carburizing without scale, soot, or tar formations. Since reversible reactions of the carburizing cycle are eliminated in the Lithcarb process, steels are said to take on carbon continuously, thus reducing carburizing time to a minimum.

Shown in one of the illustrations herewith are two identical steel parts. The part at the left, an ordinary gas-carburized part, was treated for eight hours. The Lithcarb-urized part at the right was treated for only three hours in the Lithcarb Atmosphere Furnace.



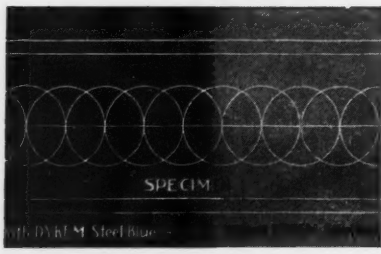
Identical steel parts. (Left) Gas carburized for eight hours. (Right) Lithcarb-urized for three hours. Depth of case same for each—0.045 in.

Both parts have a 0.045-in. total depth of case.

The Lithcarb Atmosphere Furnace has a tubular frame over which is fitted a shell of all welded, one piece construction. The furnace is provided with louver plate ventilation and is finished in a special heat-resistant machinery-gray enamel. Specifications are as follows: outside dimensions, 46 in. wide, 10 ft. 6 in. long, 70 in. high; working dimensions of muffle, 12 in. wide, 30 in. long, 6 in. high; temperature range, 1,200 deg. F. minimum, 1,800 deg. F. maximum continuous; approximate shipping weight, 7,850 pounds.

Portman Optical Projector

An optical projector of substantial construction for use in shops, tool-rooms, laboratories, or production departments has been placed on the market by the Portman Machine Tool Co., 17 and 19 Beechwood Ave., Mount Vernon, N. Y. Objects to be measured, inspected, or compared are simply placed on the work rest member of the stage, thereby eliminating the need for numerous staging or holding fixtures.



DYKEM STEEL BLUE

Stops Losses in Making Dies and Templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information

THE DYKEM COMPANY

2301 F. NORTH 11th ST.

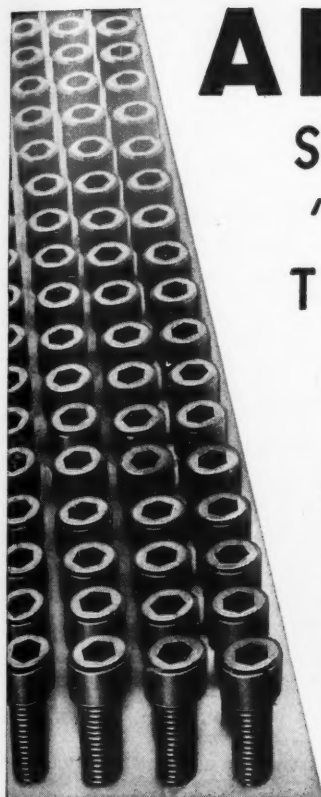
ST. LOUIS, MO.

(In Canada: 3194 Dundas St., W., Toronto, Ont.)

ALLENS

SEASONED "SHOCK TROOPS"

31 YEARS IN THE SERVICE



IN shock-resisting machine assemblies, "ALLENS" have held the front since 1910. And the sharp increase in disruptive stresses — the *new* attacks of emergency strains — are well within the Allen factor of safety. Strength of the product reflects itself in strength of demand for the *genuine*. The largest production-capacity in the industry is giving all it has to meet this demand — *more than two million* precision hollow screws each week.

Every one of these Allen screws goes out as a tested unit of HOLDING-POWER . . . Laboratory tested, *above* specifications, pledged to defend the reputation of your product in *extra-duty* assignments.

Your local Allen Distributor will accommodate you to the best of his capacity and available supplies.

THE ALLEN MANUFACTURING COMPANY

HARTFORD, CONNECTICUT, U.S.A.

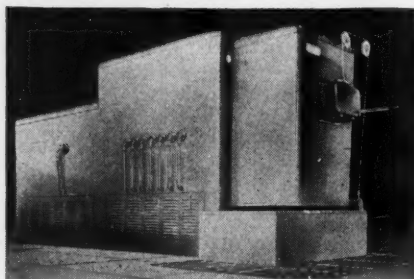
October, 1941

MODERN MACHINE SHOP 223

blades, hammer tips, special cutters, and foot gage for controlling the depth of cut.

"Lithcarb" Atmosphere Furnace

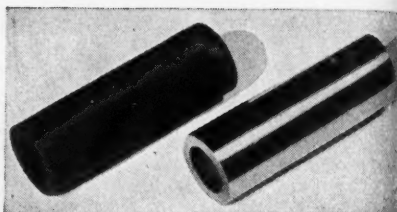
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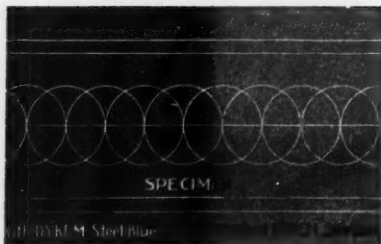
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Every one of these Allen screws goes out as a tested unit of HOLDING-POWER . . . Laboratory tested, *above* specifications, pledged to defend the reputation of your product in *extra-duty* assignments.

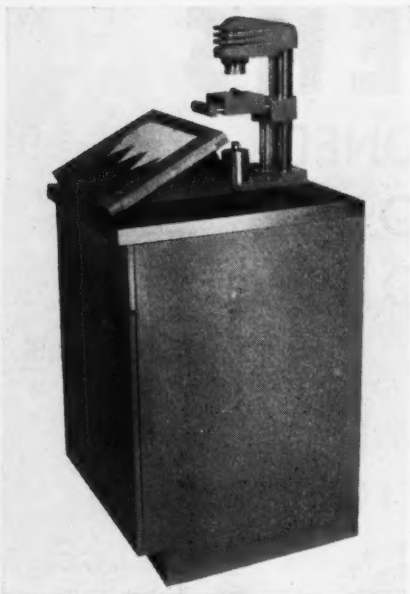
Your local Allen Distributor will accommodate you to the best of his capacity and available supplies.

THE ALLEN MANUFACTURING COMPANY

HARTFORD, CONNECTICUT, U.S.A.

October, 1941

MODERN MACHINE SHOP 223



Portman Optical Projector

Among the outstanding features embodied in the Portman Projector is the utilization of the Action Optical System. This optical system permits the ready change of image magnifications. The projector is available with plain type stage unit or may be equipped with a co-ordinate type staging unit consisting of movable members for side-wise and forward travel. The co-ordinate stage unit includes dial type indicators reading in 0.001 in. for rapid visual detection of object errors. The reflected image is projected on a clear or ground glass screen.

Since there is but one adjustment to be made in operating the Portman Optical Projector, inexperienced operators, the manufacturer claims, may be employed for the most critical inspection operations. Standard magnifications available are 10, 20, 30, 45, 60, 80, and 100.

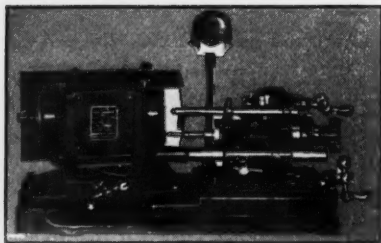
Smooth-On Cements and Manual for Use of Smooth-On

This booklet, now being distributed by Smooth-On Manufacturing Company, 572 Communipaw Ave., Jersey City, N. J., describes the different standard compositions of Smooth-On, identifies them by number, and gives directions for the use of each of the different grades.

Smooth-On Cements are made in paste or powder form, prepared for use by mixing with water. The usual procedure is to mix the powder with water until a stiff paste is made, which is then applied to the crack, hole, or aperture to be filled. The paste hardens in a few hours.

Smooth-On No. 1 is used extensively by welders as a filling and seal for surface cracks, pits, and porous spots after welding. Smooth-On No. 2 is used for the same purpose, but No. 2 expands in hardening, thus providing a pressure-tight seal. The other grades have their distinct advantages for different applications.

Smooth-On is used to repair leaks in boiler breeching, leaky joints in smoke stacks, under clamps to repair pipes that need reinforcement, with clamps to repair holes in tanks, to seal circular openings, tubes, or pipe connections, to strengthen worn or corroded surfaces of tanks or shells, to seal porous spots in castings and welds, to repair cracks in valves and fittings, to make pipe



SHARPENED TAPS LAST LONGER

You'll get more service from your taps if you keep them sharp.

The J-B Tap Grinder sharpens right or left hand taps (2, 3, 4 or 5 flutes) uniformly on the chamfer . . . grinds any taper or angle of chamfer desired . . . can be accurately set or quickly changed for amount of relief.

Write for folder M.

EDWARD BLAKE COMPANY

634 Commonwealth Ave., Newton Centre, Mass.

3 BUILT-IN SUCCESS FACTORS

WHEELS
for Cylindrical Grinding

1. Fractional Grades

Three degrees of hardness in a single grade, offering a wider range for a more accurate wheel selection.

2. Controlled Porosity

Manufacturing control over the size and distribution of pore spaces between the abrasive grains, assuring wheel duplication.

3. H9 Vitrified Bond

An improved wheel bond, assuring cooler cutting, longer life, increased production rate, lower operating costs.



BAY STATE ABRASIVE PRODUCTS CO.
WESTBORO, MASSACHUSETTS

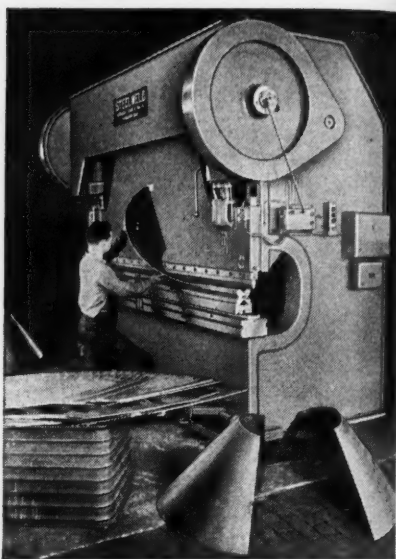
joints leakproof, to stop leaks in flanged joints, and for a wide variety of similar applications.

The booklet "Smooth-On Cements and Manual for Use of Smooth-On" will be sent free upon request.

Ram-Tapering Mechanism for Steelweld Bending Presses

The complete line of bending presses made by the Steelweld Machinery Division of The Cleveland Crane & Engineering Co., 1111 E. 283rd St., Wickliffe, Ohio, is now being furnished with a ram-tapering mechanism which is said to make possible a new field of applications for the presses without the use of special dies.

The illustration shows the tapering mechanism applied to a bending press for use in the manufacture of conical sections. The ram of the press is tapered simply by operating the long lever with ball handle in front of the ram, thereby disengaging the ram clutch. This permits operation of the right-hand ram screw only, which raises or lowers the right end of the ram, thus producing the desired taper. Either end of the ram can be tapered as much as



Ram-Tapering Mechanism Applied to Steelweld Bending Press Model 14-10

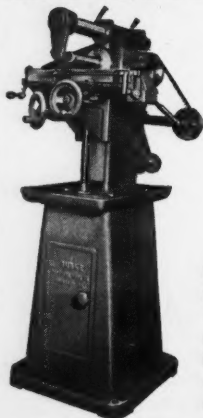
$\frac{1}{4}$ in. per foot length of bed. There are no bolts to loosen or tighten. The ram swivels on trunnions in the slides, thereby eliminating cramping on guides or bearings.

The press shown in the illustration is working $\frac{1}{8}$ -in. steel. Two of the sections being formed make the bottom of a 48-in. diameter bucket. This particular machine is a Steelweld Bending Press Model 14-10, and is designed to handle plate 10 ft. x $\frac{1}{8}$ in. between housings and 12 ft. x $\frac{1}{4}$ in. over entire length of bed and ram.

"Dustkop 600" Dust Collector

A unit-type dust collector having a 600 c.f.m. rating and designed to exhaust pedestal, bench, and surface grinders, cut-off machines, and so on, has been added to the line of dust collectors and air conditioning equipment built by the Agat-Detroit Mfg. Co., 961 Book Bldg., Detroit, Mich. The unit, which is known as the "Dustkop 600," is equipped with a $\frac{1}{4}$ h.p., 3,450 r.p.m., 110 volt, a.c., continuous duty, single phase motor to provide a waterlift of approximately 3.3 in., and is sufficiently compact for mounting on a grinder or

BURKE Milling Machines



No. 4
Motor Driven
Milling
Machine

Mounted on
Cabinet
Column

Burke motor driven milling machines Nos. 1, 2, 3, and 4 are specially suited for handling small, difficult work on a production basis.

Write for complete information.

BURKE MACHINE TOOL CO.

297 E. 16th St.

Conneaut, Ohio



Surface Protection

AS a battleship stands guard on the surface of the sea, so do **EGYPTIAN FINISHES** do their bit by standing guard on the surface of Machine Tools.

EGYPTIAN FINISHES have been doing a fine job of surface protection on the products of leading machine tool manufacturers for a number of years. As a result, they have come to be recognized as a standard of comparison in this field.

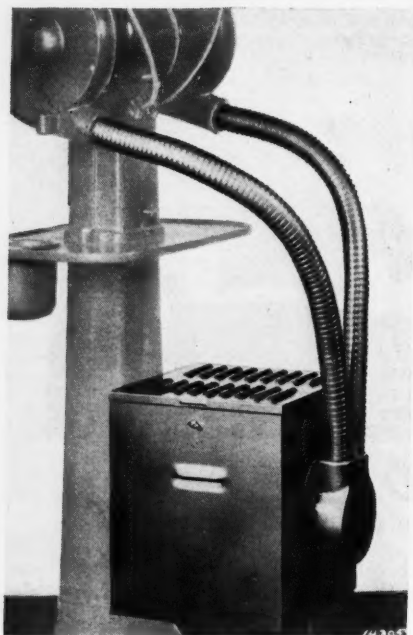
A complete line of **EGYPTIAN MACHINE TOOL FINISHES** includes all necessary finishing materials from primers and fillers to top coats.

We will be glad to tell you more about **EGYPTIAN MACHINE TOOL FINISHES**.

THE EGYPTIAN LACQUER MANUFACTURING CO.
ROCKEFELLER CENTER NEW YORK



EGYPTIAN Superior FINISHES



"Dustkop 600" Dust Collector

on the floor behind a machine.

When connected with a tool grinder, as shown, a two-way intake flange is supplied. Two lengths of 2-in. flexible rubber hose complete the connection between the unit and the wheel hoods. When employed to serve only one wheel, an intake flange to accommodate a 5-in. pipe elbow is supplied.

The collected dust and dirt is removed by lifting a louvered cover, taking out the filter assembly, and lifting a pan into which the dust has fallen after

being stopped by the filter. Filters are of a spun glass variety, are said to stop over 99 per cent of the dust, and can be quickly and economically renewed. According to the manufacturer, the construction and design of the Dustkop are such that they will not support combustion.

The Dustkop 600 Dust Collector is supplied complete with motor, fan, filter unit, plug-in electrical cord connection, and intake flange for either two-way or single 5-in. connection.

Esso "Van Caloria" Oils

Designated by the trade name of "Van Caloria," oils containing colloidal graphite and designed for high temperature lubricating (above 400 deg. F.) have been added to the line of industrial lubricants featured by Esso marketers. These oils are being distributed by Standard Oil Companies of New Jersey, Pennsylvania, and Louisiana, the Colonial Beacon Oil Company, and Penola, Incorporated.

Under the high temperatures for which the lubricants are designed, the oil gradually vaporizes, leaving no carbon residue but only a fine film of "dry" colloidal graphite. Under friction and heat, this graphitic film is absorbed by the surface material, forming what is known technically as graphoid surface. Lubrication from that point on is entirely "dry" until the supply of oil is renewed. Thus, the graphite prevents actual metal-to-metal contact until a new supply of Van Caloria reaches the bearing surfaces.

The Van Caloria Oils are available in several viscosities to suit varying lubricating conditions and methods. The oils range in viscosity from light-bodied liquids to highly viscous types. The oils

EVANS HIGH SPEED STEEL REAMERS



LOOK AT THESE FEATURES

- No honing.
- Will not chatter.
- Chrome-like finish.

- Perfect alignment.
- Full bearing surface.
- Left and right spirals.

- 50 to 80 thousandths expansion.
- Cannot fall in slots or oil grooves.
- Extension pilots for line-up work.

**WILL SHIP ON
30 DAYS' TRIAL**

EVANS FLEXIBLE REAMER CORP.
4541 RAVENSWOOD AVE. • CHICAGO, ILL.

**WRITE FOR
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CURTIS Hydraulic Lifting Cylinders

OFFER

Low first cost
Inexpensive operation and
maintenance
Use of shop air lines or electric current
Instant, accurate control
Capacities up to 17 tons
Safely oil locked at all heights
Quick, easy installation



INCREASE OUTPUT.. REDUCE WORKER FATIGUE

This Curtis Hydraulic Lifting Cylinder installed in the St. Louis plant of the Orchard Paper Company is used in feeding a press with large sheets of cardboard, composition board, imitation leather, etc. The platform is elevated at intervals as the sheets are taken off the stack and fed into the press by the pressman.

Thus sheets are always at a convenient level, without stooping. More sheets per hour can be handled and with much less fatigue.

If your plant or factory has a material handling problem—you'll find that you, too, can do this type of work, faster, better, with less manual effort and at a lower cost—with Curtis Hydraulic Lifting Cylinders.

Send the coupon for detailed information and free bulletin on "How Air Power Is Being Used in Your Industry."

CURTIS PNEUMATIC MACHINERY DIVISION
of Curtis Manufacturing Co.
1913 KIENLEN AVE., ST. LOUIS, MO.

Please send me booklet, "How Air
Is Being Used in Your Industry."

Name.....
Firm.....
Street.....
City.....State.....

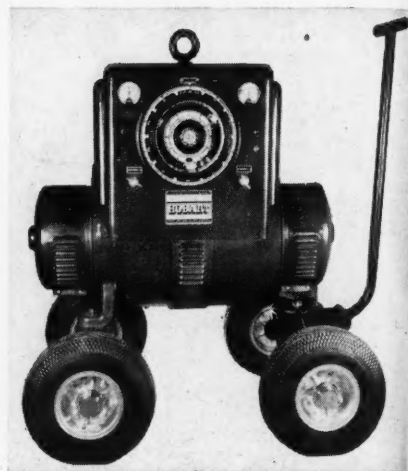
CURTIS
ST. LOUIS • NEW YORK
CHICAGO • SAN FRANCISCO
PORTLAND

are black in color due to the graphite suspended in the oils, and may be applied by any of the following methods: spray, oilcan, mechanical lubricator, pressure gun, and so on, depending on the design of equipment and operating conditions.

Trailer for Mounting Hobart Electric Drive Welders

A four-wheeled lightweight pneumatic-tired trailer for mounting all Hobart Electric Drive Welders is announced by Hobart Bros. Co., Troy, Ohio. The easy portability of the trailer enables welding machines of this type to be quickly conveyed to different parts of the plant and yard for emergency production, maintenance and repair work.

The trailer is designed so that the mounting of a welder is easily accomplished by means of four bolts located in the frame of the trailer which register with four holes in the legs of the welding machine. The unit is easily moved by hand by virtue of the low, underslung construction, narrow 27-in.



Hobart Electric Drive Welder Mounted on Trailer

tread, and method of balancing.

The trailer is of arc welded steel construction throughout, weighs 120 lb., and measures 12½ in. high. Overall height, 45 in.; overall width, 44 in.; distance from hub to hub, 33 in. The unit has a 25 per cent tilting angle and is equipped with 14-in. jumbo four ply tires.

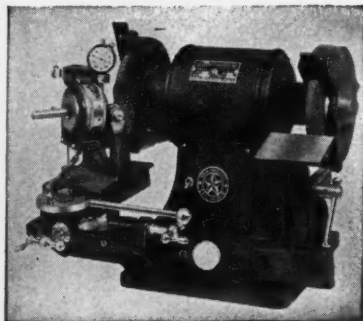
Frantz Models PQ-5 and PQ-1 FerroFilters

Models PQ-5 and PQ-1 FerroFilters have been added to the line of permanent magnet FerroFilters marketed by S. G. Frantz Co., Inc., 161 Grand St., New York, N. Y. The units are designed to magnetically extract both coarse and fine iron particles (even as microscopically small as 1/25,000 in. diameter) from suspension in circulating oil systems. They can be used in lubricating systems of Diesel and other internal combustion engines, turbines, aircraft run-in stands, machine tools, and so on, coolant systems of boring, honing, and small screw machines, and so on.

The stack of patented screens or grids, which is a distinctive feature of all FerroFilters, is energized by two powerful permanent magnets. The magnetic particles are drawn from the liquid to the screen edges and held there

PERFECT POINTS ON STANDARD DRILLS

SIZES No. 41 to 5/8"



Trim your drill costs with a STAR Precision Drill Grinder. Write for Folder.

Star Machine & Engineering Corp.

Division Star Electric Motor Co.,
BLOOMFIELD, N. J.

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ROTO-CLONES assure

Complete dust control at the

WRIGHT AERONAUTICAL CORPORATION

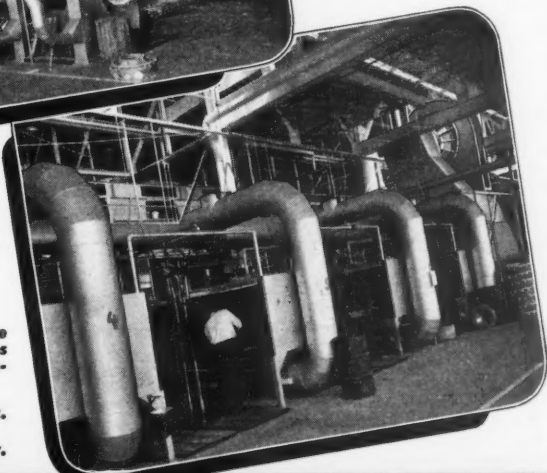


Objectionable dust caused by abrasive cleaning, grinding, and casting finishing is collected in the new Wright Magnesium Foundry by six Type W Roto-Clones exhausting 103,000 c.f.m. Overhead exhaust ducts carry collected material to the Roto-Clones which combine in a single compact unit-exhauster, dust collector, and storage hopper.

The constant exhaust volume and use of water sprays in the Type W Roto-Clone assure rapid removal of dust generated by grinders, band saws, and at cleaning benches where castings are finished.

Write for complete descriptive bulletins on the Roto-Clone and its applications to all abrasive cleaning dust problems.

AMERICAN AIR FILTER CO., Inc.
Incorporated
237 Central Ave. Louisville, Ky.



ROTO-CLONE

Dust Control System

firmly until the FerroFilter is cleaned. This is done by removing and washing the screen stack. The screens are of soft steel and demagnetize themselves



Frantz Permanent Magnet FerroFilter

as soon as they are taken away from the permanent magnets.

The Models PQ-5 and PQ-1 FerroFilters are self-contained, have no moving parts, and require no electric power. In addition, the units are full flow and all parts are accessible for quick cleaning.

Specifications of the Model PQ-5 are as follows: pipe connection size, 2 in.; capacity, lubricating oil U. S. gal. per min., 90; height overall, 11½ in.; length over pipe connections, 11½ in.; diameter of shell, 9¼ in.; weight, 72 lb.; working pressure, 100 lb. per sq. inch.

The specifications of the Model PQ-1 are: pipe connection size, ¾ in.; ca-

capacity, lubricating oil U. S. gal. per min., 5; height overall, 5¼ in.; length over pipe connections, 3¾ in.; diameter of shell, 2½ in.; weight, 3 lb.; working pressure, 100 lb. per sq. inch.

DoAll Band Saw Sizes Conform to O.P.M. Ruling

In line with the August 20th ruling of the Office of Production Management to standardize saw sizes as another aid to the Defense Program, DoAll Band Saws, product of the DoAll Co., 1201 Thacker St., Des Plaines, Ill., will be made in the future in the 42 standardized sizes given below, all raker tooth, heavy set, A temper:

			Pitch (Number of Teeth to Inch)	
Width	Gauge	Set		
1/4 in.	0.025	0.042		18 32
1/2 in.	0.025	0.042	10	14 18 24 32
3/4 in.	0.025	0.042	10 12	14 18 24 32
1 in.	0.025	0.042		18 24
1 1/4 in.	0.025	0.042	8 10	14 18 24
1 1/2 in.	0.025	0.042	6 10	14 18 24
1 3/4 in.	0.032	0.050	8 10	14 18 24
2 in.	0.032	0.050	6 8 10 12 14	
2 1/2 in.	0.035	0.057	6 8 10	14

No other sizes can be supplied without the approval of the Office of Production Management.

Behr-Manning Model 12-A Speed-Wet Sander

The illustration shows the Model 12-A Speed-Wet Sander now being marketed by Behr-Manning, Troy, N. Y. The sander is designed to fit the hand and may be used for dry sanding or with water, gasoline, or oil. The unit is con-

Here's a Real Spring Winder!

- No. 1 Capacity 0 thru 3/32" wire, \$1.25
- No. 2 Capacity 0 thru 3/16" wire, 2.50
- No. 3 Capacity 0 thru 5/16" wire, 5.00



Will Earn Its Cost In One Day
The HJORTH Perfection Spring Winder offers the ideal means of winding extension, compression, torsion, taper, double taper, or left hand springs. Try one in your shop. You'll like it and the price is reasonable.

HJORTH LATHE & TOOL CO. 12 BEACON STREET
WOBURN . MASS.

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ACCURACY
is sealed in!



SNAP-ON'S *new* TORQOMETER

equalizes bolt tensions correctly...eliminates distortion

Simplified in principle and unvaryingly accurate, Snap-on's new Torqometer makes it easy to tighten bolts to pre-determined, uniform tensions. Distortion in valves, cylinders, transmission systems, etc., can be effectively controlled and excess wear minimized. Tool set-ups can be adjusted for extreme accuracy, and machinery in general kept running more smoothly when stresses and strains are equalized correctly with this handy tool. Snap-on Torqometers and 3,000 other fine tools are conveniently near you . . . thru 34 Snap-on

branches and 550 traveling representatives who bring tools direct to you to "see and try before you buy." Send for catalog and full information.

Snap-on
Tools

for Production, Service, Maintenance

SNAP-ON TOOLS CORPORATION

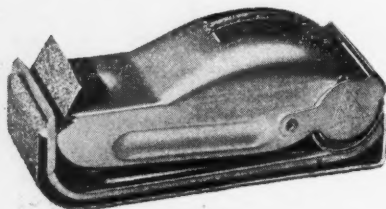
8032-J 28th Avenue

Kenosha, Wisconsin

October, 1941

MODERN MACHINE SHOP 233

structed in such a manner as to hold a length of abrasive paper or cloth tightly in position over a replaceable



Behr-Manning Model 12-A Speed-Wet Sander

Neoprene pad, and is recommended for sanding flat or slightly curved surfaces.

The Behr-Manning Speed-Wet Sander has a magazine in which a reserve supply of abrasive paper or cloth is rolled so that once the sander is loaded, the operator may continue sanding for a considerable length of time before re-loading the block with an unused portion of abrasive material. When the sanding surface becomes unsuitable for further use, the operator pauses for a moment, unfastens a clamp, and pulls a new sanding surface into position,

tearing off the worn out end. This operation is repeated when necessary until all reserve sandpaper in the magazine is used.

Acromark Steel Stamping Die and "True Center" Stamping Type

To speed up the production of timing rings, dials, graduated rings, and other precision adjustment parts, The Acromark Corp., 251-257 N. Broad St., Elizabeth, N. J., is now offering a new type of steel stamping die for use in punch



Acromark Steel Stamping Dies

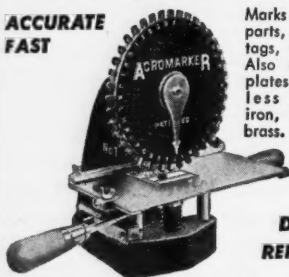
presses. The dies shown in the illustration were used for marking dials and timing rings used on aircraft parts and lathe attachments.

To use, the Acromark Steel Stamping Die is placed in a power press and the part to be stamped is centered underneath it in a fixture. Each impression is said to result in an accurately graduated and numbered part. The marked part can be filled with black or other color enamel or paint to make the markings more pronounced.

Precision stamping type for use in

Numbering and Lettering Machine Easily Operated by Unskilled Help

**ACCURATE
FAST**



Marks steel defense parts, name-plates, tags, castings, etc. Also makes name-plates from stainless steel, sheet iron, aluminum or brass.

**DIES ARE
REPLACEABLE**

- No. 1—Any one size of dies, $\frac{1}{8}$ " to $\frac{3}{8}$ "...\$135.00
Throat depth, $\frac{3}{4}$ ". Mouth opening, $\frac{1}{4}$ ".
- No. 5—Any one size of dies, $\frac{1}{8}$ " to $\frac{1}{2}$ "...\$175.00
Throat depth, $7\frac{1}{2}$ ". Mouth opening, $3\frac{1}{4}$ ".
- No. 7—Any one size of dies, $\frac{1}{8}$ " to $\frac{3}{4}$ "...\$250.00
Throat depth, $7\frac{1}{2}$ ". Mouth opening, $3\frac{1}{4}$ ".

Several Sizes Now In Stock

The ACROMARK Corporation

251 N. BROAD ST.

ELIZABETH, N. J.

"Makers of Marking and Numbering Machines"

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"SPOT" IN YOUR PLANT!

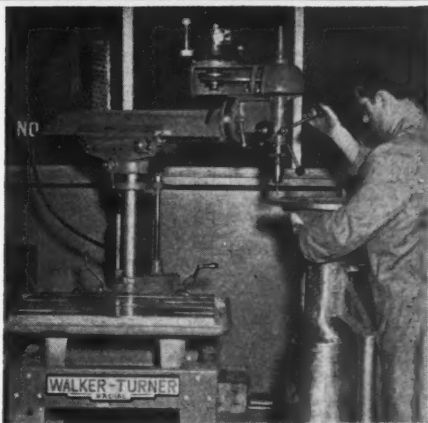
**CHECK YOUR PRODUCTION KINKS . . .
WRITE US FOR HELP**

In thousands of plants—large and small—these fast, accurate, dependable W-T machines are helping to speed up production of everything from battleships to women's compacts. A typical example is the Lionel Corporation, famous manufacturer of miniature railroads. These photographs show a few of the Walker-Turner "spots" in the plant of this progressive company.

It's a safe bet that there's at least one "spot" in your plant where W-T machines can be used to greater advantage than any other. It may be on the production line or in the maintenance shop; in the pattern shop or the shipping department.

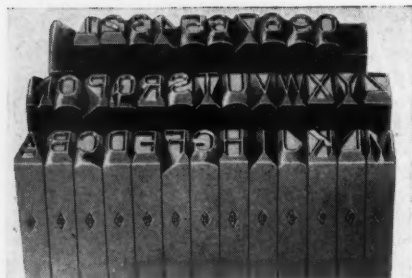
Investigate that kink that doesn't look too important. It might show a *progressive* slowing up of operations—a loss of time and money. This is the "spot" where one of the many Walker-Turner machines could do a job. Better look it over and write us now. WALKER-TURNER CO., INC., 701 Berckman Street, Plainfield, New Jersey.

Photographs courtesy of Lionel Corporation, Irvington, N. J.



WALKER-TURNER PRODUCTS

DRILL PRESSES • LATHES • BAND SAWS • BENCH SAWS • TILTING ARBOR SAWS
JIG SAWS • RADIAL SAWS • RADIAL DRILLS • BELT AND DISC SURFACERS
GRINDERS • JOINTERS • SPINDLE SHAPERS • FLEXIBLE SHAFT MACHINES • MOTORS

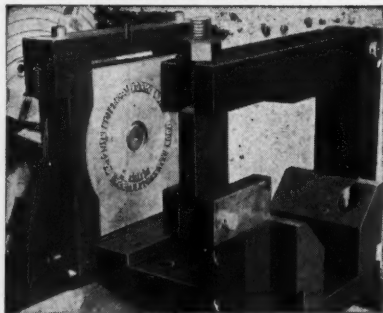


Acromark "True Center" Stamping Type

gang holders or mortised dies to number parts is also being offered by Acromark. The type is made of a shock-resisting alloy tool steel engraved "true center" for perfect spacing and alignment. Each piece is carefully hardened, tempered, and ground to size.

Acromark "True Center" Stamping Type is suitable for stamping steel, alloy, cast iron, and other metals or materials. The type is available in all sizes from $\frac{1}{8}$ to 1 in. The standard length of each piece is type high or 1 in.; however, lengths to suit particular requirements can be furnished on order.

For Stamping Base of Finished Shells SHELL MARKING MACHINE No. 2



(LATHE FIXTURE)

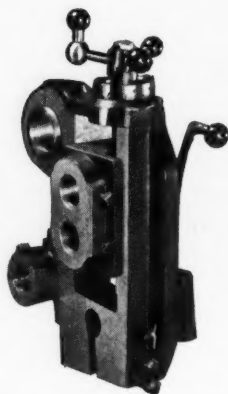
Can be furnished as a complete machine or to fit on an ordinary lathe.
Write for complete information.

M. E. CUNNINGHAM CO.
158 E. Carson St. Pittsburgh, Pa.

Gisholt Turret Lathe Tool

A new heavy duty adjustable turning head for turret lathes has been announced by Gisholt Machine Company, 1219 East Washington Ave., Madison, Wisconsin. This tool is designed for turning and boring work, accommodating standard cutter holders in one of the two holes on the slide, as well as additional tool holders in the auxiliary slide mounted at the rear. Provision is also made for the mounting of a drill or boring bar, together with a facing cutter.

The main slide is quickly adjusted to size by means of a ball crank handle,



Gisholt Turret Lathe Tool

fitted with a large micrometer dial and observational clips. A long binder lever rigidly locks the tool slide, permitting heavy, accurate cuts. The auxiliary slide is vertically adjustable. An extra large overhead pilot bar, giving support to the tool, can be mounted on the machine or on the tool itself.

In writing for information, the make and model of turret lathe in use should be given in the letter.

"Hercules" No. 3 Arbor Press Outfit

A complete stamping outfit for use in stamping numbers into defense parts of various types, name plates, tool checks, workmen's badges, metal or fiber identification tags, gears, and other items, to be known as the "Hercules" No. 3 Arbor Press Outfit, is now being offered

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**"FRONT and
CENTER"**



**CJB
AHLBERG**

MAXIMUM
CAPACITY
RADIAL AND
THRUST TYPE
BEARING




AHLBERG PILLOW BLOCKS *Serve under severe conditions*

THE COMBINATION of qualities found in this ball and socket, self-aligning pillow block distinguish it from ordinary designs. They make it preferable for jobs where performance and dependability are paramount.

Ball and socket design — easier to install — easier to align. Maximum ball type double row bearing. Great radial capacity — extra thrust capacity — smooth running at high speeds.

Patented adapter type shaft lock — assures full contact on shaft — positive lock — centers shaft — eliminates vibration — assures full capacity of bearing.

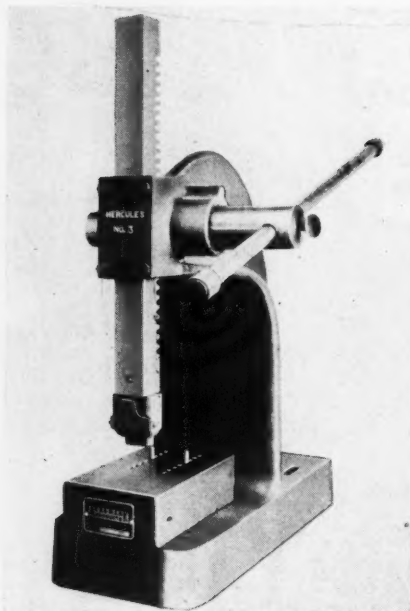
Floating type Labyrinth  Seals are most efficient — keep out dirt and retain lubricant. Write for complete Bearing Catalog.

AHLBERG BEARING COMPANY

Manufacturers of CJB Master Ball Bearings

3029 West 47th Street

Chicago, Ill.



"Hercules" No. 3 Arbor Press Outfit

by The Acromark Corp., 251-257 N. Broad St., Elizabeth, N. J. The outfit consists of a precision constructed arbor press having a square ram to ensure straight up and down movement. The ram is fitted with a press style Hercules Type Holder holding any number of pieces of interchangeable type up to the capacity of the press, which is 50 to 1.

The stamping block is cast iron machined and finished smooth and parallel with the face of the type. The block is provided with guide pins that can be

placed in the proper position for locating the mark on the part to be stamped.

"Powerlox" Non-Slip Pulley Facing

A non-slip pulley facing which can be applied to any flat face or crown pulley, to be known as "Powerlox," is now being marketed by the Simplex Chemical Corp., 37-39 33rd St., Long Island City, N. Y. The compound, upon setting, forms a non-abrasive outer covering on the pulley which is said to ensure an ideal frictional grip between pulley and belt and prolong belt life.

After cleaning the pulley, Powerlox can be quickly applied with a brush packed with every can of the compound, thereby, the manufacturer claims, making the pulley impervious to the action of oil, grease, dust, acid, gases, heat, and so on. Powerlox Non-Slip Pulley Facing is supplied in 1-gal. containers, ready for use and with application instructions.

Ingersoll-Rand Size 534 Impact Wrench

Designated as the Size 534, an improved air-operated impact wrench for use in applying and removing nuts up to 1½-in. bolt size has been placed on the market by the Ingersoll-Rand Co., Phillipsburg, N. J. The unit is designed with the patented Pott Impact Wrench principle which localizes the steel to steel impact without transmitting shock to other parts of the tool. No reversing gears are used. The small nose diameter and short overall length enable the wrench to be operated in

**PUT IT TO
YOUR OWN TESTS**

FOR TOOL, DIE, PATTERN OR TEMPLATE
LAYOUT ON METAL. A handy five-ounce
can sent to you postpaid for

**MICHIGAN CHROME
& CHEMICAL CO.**
6350 E. Jefferson Ave. • Detroit

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New

POWER FEED Drill Presses

Speed Up Production CUT COSTS!

These new Delta Power-Feed Drill Presses quickly pay for themselves in time saved and reduced operating costs. They enable operators to perform other work while the drill automatically completes its drilling cycle. Sensitive hand drilling and heavy power feed drilling are both handled with equal ease and accuracy. Careful engineering, built-in quality and low prices in these new Drill Presses assure you the usual Delta extra machine value. Check into these latest products of Delta engineers and learn what they can do for you!

Outstanding Features of these Remarkable New Power Feed Drill Presses

1. Husky worm drive-hardened and polished for long life.
2. Automatic stop and return, adjustable to any job.
3. Hand or power feed selected instantly.
4. Eight rates of feed for each spindle speed.
5. Special power feed belt tension releases built into guard.
6. Automatic stop assures uniform depth of holes to close tolerance.
7. Completely guarded.
8. Available in single and multiple spindle units (any number of spindles).
9. Powered with either Delta or NEMA frame motors.
10. . . . PLUS low cost, low upkeep and all of the other outstanding features found in Delta drill presses.

Write for
Bulletin giving
complete details,
specifications and
prices on the new
line of Delta 17"
Power Feed
Drill Presses.

DELTA MILWAUKEE

Delta Manufacturing Co.,
601-L East Vienna Ave.
Milwaukee, Wisconsin

Please send me Special Bulletin on
the new line of Delta 17-inch Power
Feed Drill Presses.

Name _____

Address _____

SECOMET

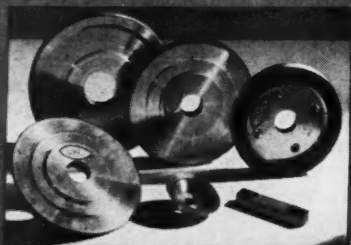
DIAMOND WHEELS

FAST CUTTING HIGH FINISH LONG LIFE

With SECOMET Diamond Wheels, you can sharpen cemented carbide tools in a fraction of the time required by other wheels.

You can give your tools a more accurate, sharper, flatter surface without lapping them. You can recondition tools down to a minimum of tip thickness.

**Write for full details
on any type of diamond
wheel. No obligation.**



J. K. SMIT & SONS, INC.

157 CHAMBERS ST., NEW YORK, N. Y.

Seattle, Wash.

Chicago, Ill.

Detroit, Mich.

W. Hartford, Conn.

Pittsburgh, Pa.

Cleveland, Ohio

close quarters, and smooth, balanced power with negligible torque reaction makes possible safe and convenient one-hand operation.

The Size 534 impact wrench is said to be ideal for use in shipyards, oil refineries, chemical plants, steel construction and general repair shops. Specifications are as follows: average working



Ingersoll-Rand Size 534 Impact Wrench in Use in Running Up Cap Screws in a Large Industrial Plant

speed at 90 lb. pressure, 635 r.p.m.; weight, 27 $\frac{1}{4}$ lb.; length, less chuck, 18 $\frac{1}{8}$ in.; hose, $\frac{3}{4}$ in.; distance from center of spindle, 2 inches.

Fluorescent "Controlenses"

The Holophane Co., 342 Madison Ave., New York, N. Y., is now manufacturing three prismatic glass lenses to be known as Fluorescent "Controlenses." The Controlenses, when used with fluorescent fixtures meeting the optical design specifications established by the Holophane Engineering Department, are said to produce three basic lighting distribution patterns.

The first lens, which is known as the Intensive Controlens, produces the distribution of light most commonly used in both commercial and industrial interiors—normal "uniform spacing" light-

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STEEL
Tool

October

*"You might say I took out
High Speed Steel Insurance!"*



★ Changing over to DBL High Speed Steel is just about the finest protection any user of cutting tools can get.

DBL complies with OPM orders, protects you against tungsten shortage and aids the nation's conservation program for defense, because it contains less than one-third as much tungsten as "18-4-1" High Speed Steel.

It protects you against loss of production, because in 85-90% of

all cases, it performs just as well and frequently better than 18-4-1. And it protects you against buying any new equipment or learning new techniques, because it heat-treats in exactly the same equipment and by the same methods as 18-4-1.

Solve your High Speed Steel problems, once and for all, by changing over to DBL. All you need is the DBL "Blue Sheet," which contains full technical data. *Mail the coupon below for your copy.*

ALLEGHENY LUDLUM

STEEL CORPORATION

PITTSBURGH, PA.

Tool Steel Division



Watervliet, N. Y.

Allegheny Ludlum Steel Corp. T-156
Oliver Building, Pittsburgh, Pa.
Send me a copy of "DBL Blue Sheet."

Name.....

Company.....

Address.....

October, 1941

MODERN MACHINE SHOP 241

ing of horizontal surfaces in rooms of normal height.

The second lens, the Concentrating Controlens, produces a rigidly confined focusing type of light distribution. This lens has several common applications, such as accent lighting, general illumination from great mounting heights, and "offset beam" lighting.

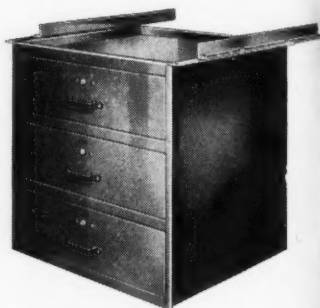
The third lens, which is designated as the Extensive Controlens, is particularly adaptable for areas where the lighting of vertical surfaces is desired or in low ceiling areas to permit economical wide spacing of lighting units.

The fixtures used in connection with the Holophane Controlenses are for three types of installations; namely, recessed flush-with-the-ceiling, "close-up" to the ceiling, and for suspension mounting. The fixtures are designated as "Controlenscent" fixtures.

Lyon Drawer Units

Efficient individual storage of tools, records, and so on, of workers on two and three-shift operations is said to be possible by means of the two and three-drawer units now being marketed by Lyon Metal Products, Inc., 3074 Clark

St., Aurora, Ill. The units may be finished for use on workbenches, stands, shop desks, and under counter



Lyon Three-Drawer Unit

Drawers feature easy sliding and key locks.

"Hallowell" Drawer Unit

A handy cabinet of drawers particularly adaptable for use in plants operating in several shifts has been added



BUTTERFIELD TAPS

You get better threads at lower cost with Butterfield Taps. This saving develops into a comfortable margin of profit through easier, sturdier and faster assemblies on the production line. Experienced engineers are at your service.

UNION TWIST DRILL CO. BUTTERFIELD DIVISION

Factories: DERBY LINE, VERMONT, U. S. A.
Athol, Mass.; Mansfield, Mass.;
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STORES:

Cleveland	3346 Superior Ave.
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New TAPPING HEAD

Quickly pays for itself

in Faster Production--Less Tap Breakage

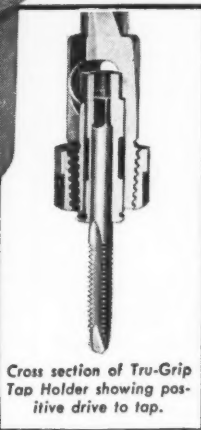


In gruelling tests on actual production work — this remarkable new High-Speed Tapping Head with the exclusive "Tru-Grip" Tap Holder has broken numerous plant records for speed of tapping, accuracy and elimination of tap breakage. There are definite reasons for this: The Tru-Grip Tap Holder is so compact and light (weighs $\frac{1}{2}$ of conventional tap holders) that fly wheel effect is reduced to a minimum. The Tapping Head offers dry, double cone friction clutch that won't wear, can't absorb oil and makes bottom tapping easy—three-point balanced heat-treated gear reversing mechanism that distributes pull and greatly reduces strain—and many other important fea-

tures. Find out how this tapping head can quickly pay for itself in your shop — and solve your tapping problems!

SEND FOR BULLETIN

giving full details, description and prices on complete line of Proconier Precision Tapping Heads to meet all needs, the new Tru-Grip Tap Holder —and also the full line of Proconier Universal Tapping Machines, hand, foot or air-operated.



Cross section of Tru-Grip Tap Holder showing positive drive to tap.

Send me Bulletins on:

☐ High Speed Tapping Heads ☐ Tru-Grip Tap Holders

☐ Universal Tapping Machines.

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PROCUNIER

SAFETY CHUCK CO.

12 S. CLINTON ST., CHICAGO

October, 1941

MODERN MACHINE SHOP 243

**YOUR PRODUCTS
ALWAYS**

IDENTIFIED

IF PERMANENTLY

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MARKING
BY ROLLING
IS FAST AND
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PRESERVES
DIE LIFE AND
PIECE PARTS.
REQUIRES
ONLY FRAC-
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APPLIED
PRESSURE
AS COM-
PARED TO
STAMPING.

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**QUICK
SET-UPS**

**MODEL 25
HI-DUTY
MARKING
MACHINE**

This machine operates from your plant air line, and is one of numerous models built to produce fast, neat marking on metal parts. Hi-Duty marking machines may be had for practically any marking operation, and we will be glad to make recommendations upon receipt of your inquiries. Send prints or samples of parts to be marked, showing lettering and location, also state required production.

GEO. T. SCHMIDT, Inc.
1806 BELLE PLAINE AVE.
CHICAGO, ILLINOIS

to the line of "Hallowell" shop equipment marketed by the Standard Pressed Steel Co., Box 556, Jenkintown, Pa. The cabinet is of sturdy steel construction and provides individual drawers for the safe keeping of tools and other equipment.

The cabinet can be made with any number of drawers, each of which is



"Hallowell" Drawer Unit

20 x 20 x 6 in. in size, and is available with cylinder locks or provisions for padlocks. The drawer unit shown here with is 52 in. high.

**Sentry Size 4 Model Y High Speed
Steel Controlled Atmosphere
Furnace**

The Sentry Company, Foxboro, Mass. has announced an Electric High Speed Steel Hardening Furnace to be known as the Size 4, Model Y. The Model Y fills a demand for a controlled atmosphere unit for high speed steels that will accommodate tools up to a maximum of 4 $\frac{1}{2}$ x 4 $\frac{1}{2}$ x 11 inches. The control atmosphere available is suitable for any type of high speed steel—molybdenum, cobalt or tungsten—through the use of the Sentry Diamond Block Method.

The furnace is offered in two styles

TUNGSTEN CARBIDE TIPPED TOOLS

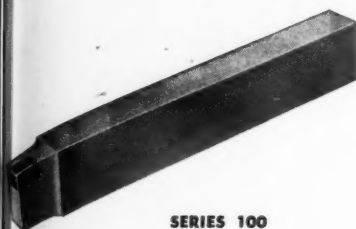
Price \$1.00 Each In Any Size

NEW LOW PRICES — INCREASE PRODUCTION — CUT OPERATING COSTS

Tools are tipped with Tungsten Carbide, and are suitable for machining cast-iron, brass, bronze, aluminum, non-ferrous materials (such as hard rubber, bakelite, etc.), and tough alloy steels up to 500 Brinell hardness.

Left—100 Series

Left Hand-Reverse Image, Right Hand Shown



SERIES 100

Tool No. RH	LH	Shank Size
R-100	L-100	$\frac{1}{4} \times \frac{1}{4} \times 2$
R-101	L-102	$\frac{5}{8} \times \frac{5}{8} \times 2\frac{1}{4}$
R-103	L-104	$\frac{3}{8} \times \frac{3}{8} \times 2\frac{1}{2}$
R-105	L-106	$\frac{7}{8} \times \frac{7}{8} \times 3$
R-107	L-108	$\frac{1}{2} \times \frac{1}{2} \times 3\frac{1}{2}$

Right— 200 Series

Tool No.	Shank Size
200	$\frac{1}{4} \times \frac{1}{4} \times 2$
201	$\frac{5}{8} \times \frac{5}{8} \times 2\frac{1}{4}$
202	$\frac{3}{8} \times \frac{3}{8} \times 2\frac{1}{2}$
203	$\frac{7}{8} \times \frac{7}{8} \times 3$
204	$\frac{1}{2} \times \frac{1}{2} \times 3\frac{1}{2}$



SERIES 200

Below— 300 Series

Tool No.	Shank Size
300	$\frac{1}{4} \times \frac{1}{4} \times 2$
301	$\frac{5}{8} \times \frac{5}{8} \times 2\frac{1}{4}$
302	$\frac{3}{8} \times \frac{3}{8} \times 2\frac{1}{2}$
303	$\frac{1}{2} \times \frac{1}{2} \times 3\frac{1}{2}$



SERIES 300

STANDARD TUNGSTEN CARBIDE TIPPED TOOL BITS

In lots of 12 assorted in any Series; 100-200-300 Series an extra 10% will be allowed; also in lot of 50 assorted 20% discount will be allowed.

Sizes not listed as well as special TIPPED TOOLS will be quoted upon request. When ordering, state tool number and quantity desired.

Carry Silicon Carbide Emery Wheels for Grinding Tungsten Carbide Tool Bits.

SEND FOR OUR NEW 1941 GENERAL CATALOG

VICTOR MACHINERY EXCHANGE, INC.

51 CENTER STREET

NEW YORK, N. Y.

RUTHMAN GUSHER COOLANT PUMPS

INSIDE . . OUTSIDE, RIGHT or LEFT

Adaptability is only one of the many advantages of GUSHER Coolant Pumps.

There's a Gusher model to speed your work. Write!



Model 2-P3

P-3 Models are available in immersed type (1-P3), flange-mounted with internal discharge (2-P3), flange-mounted with external right hand discharge (3-P3), left hand discharge (4-P3). All above are available in 2 short and long models, that is, for two maximum high water lines.

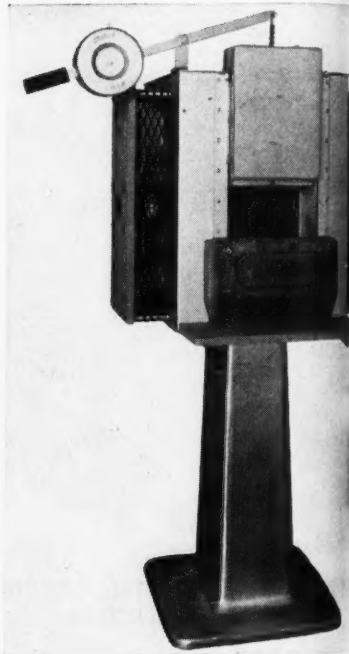
Pat. and Pats. Pend.

**Write for engineering data
and specifications.**

THE RUTHMAN MACHINERY CO.
1817 READING ROAD, CINCINNATI, OHIO
LARGEST EXCLUSIVE BUILDERS OF COOLANT PUMPS

one is pedestal mounted with an asbestos loading shelf and wire mesh minimal guards, the other is fitted with legs for bench mounting, without shelf or guards. All other specifications of either style are identical.

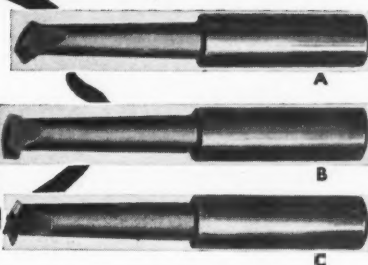
Steel shells are of extra rugged construction and are suitably insulated for 2500 deg. F. operation. The muffle is removable and has inside dimensions



Sentry Size 4 Model Y High Speed Steel Controlled Atmosphere Furnace

6 x 6 x 13 in. deep. Heating elements are Globar and are so located above and below the muffle as to assure uniform muffle temperature. The maximum rating of the furnace is 22½ Kw. in normal operation consumption range from 5 to 15 Kw. per hour. Heating time from cold to 2350 deg. F. about 75 minutes. An improved patented design of air-cooled terminals eliminates the usual water-cooling system and all terminals and electrical contacts are shielded. Either type designed for direct connection to volt or 220 volt supply without the

*For efficient
performance on
high production*



- (A) For Internal Boring (B) Facing and Bottoming
(C) Internal Threading

Made in wide range of sizes. (The small sizes shown above. The larger sizes come with cutting heads screwed securely to high-tempered shanks of special alloy.) Style A Boring Tool will outlast six normally-forged tools. Style B spe-

cially suitable for use on turret lathes and automatics. Especially adaptable for recessing. Style B has advantage of cutting cleanly a wide range of different threads in smallest borings imaginable. Also available with carbide tips.

Send for Catalog B-1139 for detailed information

BOKUM TOOL COMPANY 49 W. HANCOCK AVE.
DETROIT • MICHIGAN

Janette Speed Reducers

FOR YOUR SLOW SPEED MACHINE TOOL DRIVES
1/50 to 10 H.P. .08 to 1140 R.P.M.

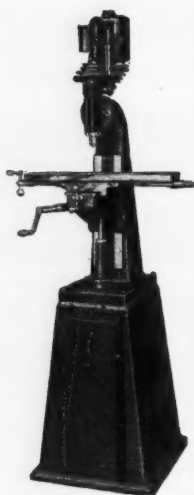
This helical gear speed reducer, one of 19 styles, is especially well adapted for driving thread millers, gear hobbers, punch presses, shears, keyseaters, planers, etc.

A reducer of this design can usually be mounted at the back of the driven machine. The gear head can be rotated to obtain correct belt clearance. Janette reducers are available with flange mounting bases and long countershafts, which can be easily mounted and connected, without belts, to various kinds of machine tools.



SEND FOR OUR 100-PAGE CATALOG

Janette Manufacturing Company
558 West Monroe Street Chicago



Wabek No. 2
Swivel Head
Milling Machine

of a transformer. Overall dimensions of the pedestal style are: width $31\frac{1}{4}$ in., depth, $29\frac{1}{4}$ in., height, $62\frac{1}{4}$ in., with the hearth $44\frac{1}{4}$ in. above the floor.

Wabek No. 2 Swivel Head Milling Machine

Specially adapted for handling small jobs normally done on larger and more expensive machines, the Wabek No. 2 Swivel Head Milling Machine shown herewith is now being marketed by Delaware Machinery Corp., 1790 Broadway, New York. The machine is said to be an efficient contour miller, modernized for exacting precision work,

and can be used for milling, boring, drilling as well as small grinding.

The spindle, which has a shank, operates on thrust ball bearings and has a speed range of 400 to 1,735 r.p.m. In addition, the spindle has a collet capacity of $\frac{1}{2}$ in. and is provided with a drawbar. The spindle swings through 180° and has a clearance of $6\frac{1}{2}$ in. from center of spindle to supporting column.

The table has a ground surface, $18\frac{1}{2} \times 4\frac{1}{2}$ in. in size, and is provided with two T-slots, $\frac{1}{2}$ in. wide. Table travel, longitudinal, 17 in.; cross travel, vertical, 10 in. All table movements graduated to 0.001 inch.

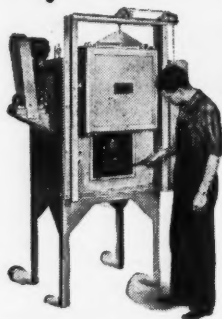
The motor is a heavy duty $\frac{1}{2}$ hp. ball bearing type, 60 cycles, 1,735 r.p.m. and is adaptable to either 110 or 220 volts. Heavier motors can be supplied.

The Wabek No. 2 Swivel Head Milling Machine is available in two types, a floor type, which has an overall height of 70 in., and a bench type, with an overall height of 44 inches.

Lyon Welding Benches

Two welding benches for use in industrial and machine shops, and now available, have been developed by Lyon

Speeds DEFENSE Production



Accurate—Uniform—Flexible—
Convenient—Speedy.
Range 275° F. to 1250° F.

DESPATCH UTILITY FURNACE

For TOOLS • DIES • PRECISION PARTS
NON-FERROUS CASTINGS AND PARTS •
HEATING ALUMINUM • FORGINGS AND
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Despatch Utility Furnaces equipped for either Despatch "Controlled Combustion" Gas Heater or Despatch Electric Heater.

See Despatch Display at the National Metal Congress and Exposition, Oct. 20-24th, or write for Bulletin No. 83-R.

DESPATCH COMPANY

MINNEAPOLIS MINNESOTA

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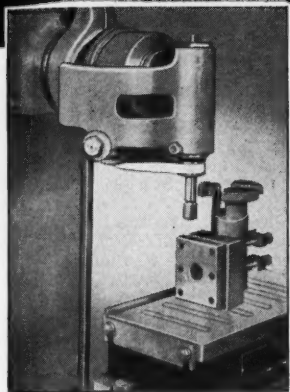
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New Grinding Attachment for TOOL and DIE and GAGE WORK



LIBERTY High Speed Grinding Attachment
Brown & Sharpe, Reid and other makes of
surface grinders.

Grinds slots, recesses and surfaces, etc.,
which are impossible to reach with large wheel.
Eliminates expensive set-up time in which
all wheels are necessary. Takes only a few
minutes to attach. 3. Handles wide variety of
all, gage, die and other grinding. 4. Extreme
accuracy—precision bearings throughout. 5.
Handles of both vertical and horizontal attach-
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Assembled complete with any size bores, pul-
leys, belts and grinding wheels at no extra cost.

Write—specifying diameter of spindle
head, type and make of grinder.

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SPEED UP TOOL ROOM PRODUCTION

Kipp Air Tools give you highest
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Grinders sell from \$9.75 to
\$58.75. Chippers and
Filers at \$19.75. The
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is only..... **\$25**

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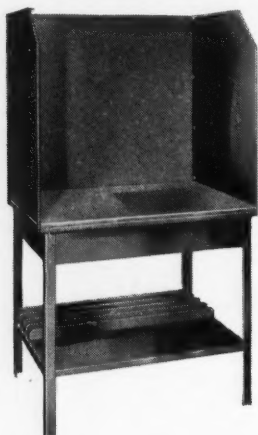
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Kipp Air Tool Catalog.

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Company.....
Address.....

MADISON-KIPP CORP.

208 WAUBESA ST., MADISON, WIS., U. S. A.

Products, Inc., 3074 Clark St., Aurora, Ill. One bench is specifically designed



Lyon Welding Bench

for gas welding, with the frame built to support a fire brick top 34 in. from the floor. The bench has a shelf with

four separators for welding rods additional space for storage.

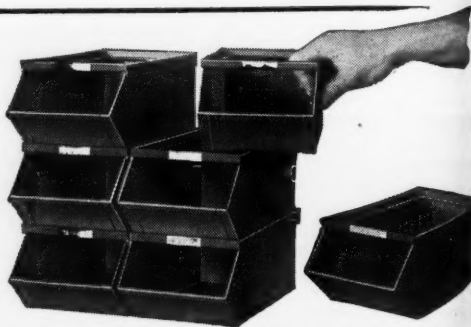
The other bench is designed for in arc welding and has a 35-in. shield on the back and sides and smooth heavy 10-gauge steel work top 33 in. from the floor. This bench also has a shelf and rod separators.

Globe Combination Universal Coil Winder

Illustrated herewith is a combination coil winding machine, now being manufactured by the Globe Tool and Engineering Co., Dayton, Ohio. The feature of the machine is that it allows high speed winding to be driven direct from the motor shaft, or high torque lower speeds driven through a belt gear arrangement. A selection between these may be made merely by shifting a lever on the gear head.

Control of the brake, motor switch and variable speed is synchronized through a foot pedal. In this manner simple control of speed through all of the speed ranges is obtained, uniformly accelerating from the slow

PARTS
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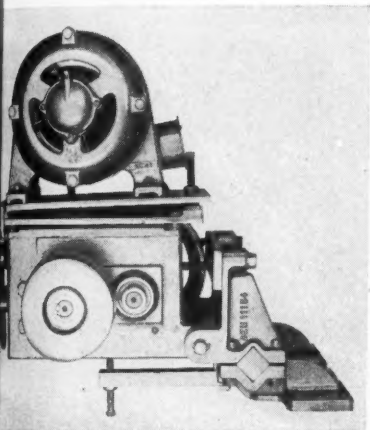
You'll save time, space and labor handling parts and materials when you use these patented **STACKBINS**. **STACKBINS** keep parts instantly accessible — eliminate waste hand motions — stack compactly to form units of exactly the right shape and capacity — make order filling or assembly work faster, easier, more efficient.

STACKBINS

"STACKED AND STILL ACCESSIBLE"

Write today for full story on patented **STACKBINS**, and learn new lessons in efficiency. Stackbin Corp., 53 Troy St., Providence, R. I.

**THE RIGHT DRIVE
FOR THE
JOB**



(Fig. 216)

No one drive meets all your requirements advantageously. Be sure to choose the correct type drive to fit your need. We offer V Belt Drives, Gear Box Drives. Send us a list of your requirements and get unbiased recommendations.

PRODUCTION EQUIPMENT CO.

5219 CHESTER AVENUE

CLEVELAND

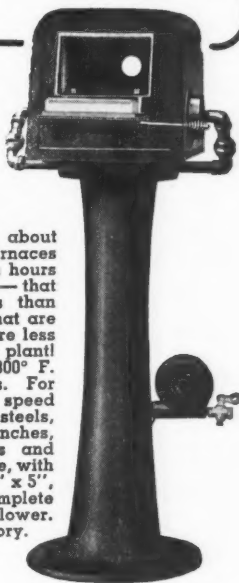
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SAVE —TIME
—MONEY
—SPACE

with these

JOHNSON Furnaces

**Johnson
No. 120
Hi-Speed
Furnace**



Find out NOW about these Johnson Furnaces that save up to 2½ hours in production time — that consume less gas than ordinary units — that are compact and require less floor space in your plant! No. 120 reaches 2300° F. in just 30 minutes. For heat-treating high speed steels, high carbon steels, for hardening punches, cutting tools, dies and parts. Pedestal style, with firebox 13½" x 7¼" x 5", heavily lined, complete with motor and blower. \$129.50 F.O.B. Factory.

(Prices subject to change without notice)

FREE—New Catalog of Johnson Gas Appliances, with Price list.

JOHNSON GAS APPLIANCE CO.

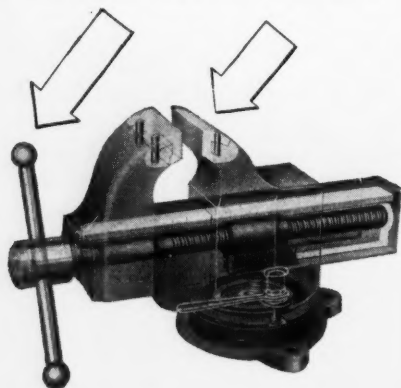
601 E Ave. N.W.

Cedar Rapids, Iowa



**JOHNSON
GAS APPLIANCES**
FOR EVERY
INDUSTRIAL PURPOSE

NO "Lost Motion" Between HERE AND HERE



Turn the handle, to grip or to release—there's no "slack" to take up. That's because every part of a Parker Vise is made and machined in our own plant. Assembled to *precision fits*. And the Parko-Metal castings, the carefully machined screw and nut, the improved saddle, hold their new-fit through years of use. Add a handle that stays put, renewable tool steel jaws, and a swivel with 360° "brake-shoe" grip and you've got the best vise that money can buy. Your younger men will appreciate a copy of our "Handbook on Vises." It's free. The Charles Parker Company, Meriden, Conn.

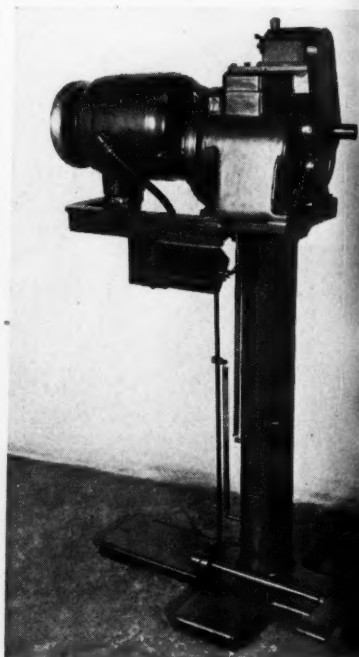
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nearby Parker distributor

PARKER VISES

America's Oldest

through an infinite number of steps to top speed or to any desired intermediate speed.

A turn counter which will count up to 10,000 is provided and may be set to automatically stop the winder on any desired number of turns. When a predetermined number of turns has been wound, the counter—through solenoid and suitable linkages—returns the



Globe Combination Universal Coil Winder

control to zero, turns off the motor switch and applies the brake.

The machine will accommodate wire sizes from No. 40 to as large as No. 10. It winds them into coils as large as 12 in. in diameter and 8 in. long at speeds up to 5,000 r.p.m. These characteristics keep this machine always ahead of the operator and act as a challenge assurance of maximum production.

Direct-drive and back-gear models are available when the combination is required. A full line of semi-automatic coil winders, and two and four-pole mature winders is also available.

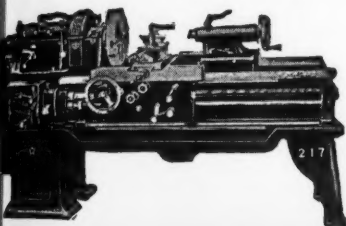
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CINCINNATI QUICK-CHANGE GEARED-HEAD MOTOR-DRIVEN LATHES

plied in 14", 16", 18", 20", 22",
", 27" and 30" sizes. To them we
any standard or special attach-
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spindle speeds, to cover every
shop requirement. Maximum
economy and speed are assured
for boring, turning or chasing
operations because every mod-
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not investigate their advantages
to obtain best results.



Better get trouble free operation
with unfailing precision.

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OAKLEY, CINCINNATI, OHIO
SPECIALISTS OVER 35 YEARS

SHEAR-CUT HIGH SPEED END MILLS

Here's a complete line of
Single and Double End Mills.

They save time and money.
Specify Progressive Shear-Cut End Mills.
Write for catalog and prices.

PROGRESSIVE TOOL & CUTTER CO.
2345 WOLCOTT ST. FERNDALE, MICH.

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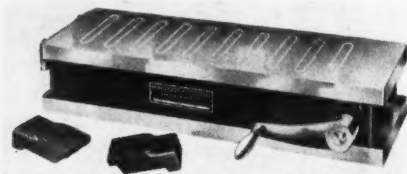
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October, 1941

MODERN MACHINE SHOP 253

B & S Rectangular Model Magnetic Chucks, Permanent Magnet Type, Nos. 1236 and 618H

The Brown & Sharpe Mfg. Co., Providence, R. I., has added a large size Rectangular Model Magnetic Chuck of



B & S Rectangular Model Magnetic Chucks, Permanent Magnet Type No. 618H

the Permanent Model Magnetic No. 1236 to its line of magnetic chucks. While this chuck is of the same design as other rectangular model Brown & Sharpe chucks, it differs in that it is of unusually large size.

The chuck has a working surface of $12\frac{1}{2}$ x 36 in. and its magnetic surface is approximately $9\frac{1}{2}$ x $29\frac{1}{8}$ in. Base

dimensions are $12\frac{1}{2}$ x 36 in.; height $4\frac{1}{2}$ in.; length over-all with crank "on" position, 41 $\frac{1}{8}$ in.; width over-all including crank, 16 $\frac{1}{8}$ in., making it suitable for large grinding and slabbing operations.

A Rectangular Model Magnetic Chuck of the Permanent Magnet Type No. 1236 which has a hardened top plate has recently been added to the Brown & Sharpe line of chucks. The hardened top plate feature makes this chuck especially useful for a great many types of work which might scar or mar the surface of a regular chuck.

These two magnetic chucks are available only in the United States of America and its territories.

Hack Combination Horizontal and Vertical Milling Machine

The Hack Machine Co., Des Plaines, Ill., announces the Hack Combination Horizontal and Vertical Milling Machine. The principal distinction between the Hack machine and the Hack Simplex Milling Machine consists in that the column of the Combination Miller is fixed while that of the Simplex reciprocates. The Hack machine is designed for the reciprocation

Cut Costs—Increase Production WITH Detroit Power Screwdrivers

THESE MAGAZINE FEED POWER SCREWDRIVERS
DRIVE SCREWS FASTER THAN EVER BEFORE

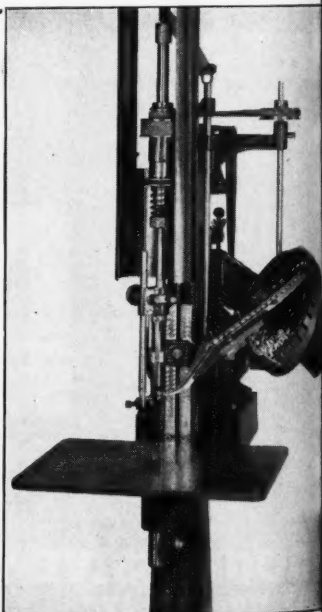
Machine screws, wood screws, brass screws, aluminum screws, self-tapping screws, drive screws, cap screws, special screws, washer assembled screws. Standard heads, special heads, Phillips heads, slotless heads.

THREE MODELS AVAILABLE
which provide handling a wide range of screw sizes. From a No. 2-56 screw to a $\frac{1}{2}$ " cap screw.

UNIFORM TENSION—NO MARKING OF HEADS
No stripping of threads
Driving Time: 1 to 2 seconds per screw.

Send Samples for Production Estimates

DETROIT POWER SCREWDRIVER CO.
5375 ROHNS AVENUE DETROIT, MICHIGAN



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Edy Spencer
says:

"THE RIGHT PLAY
AT THE RIGHT TIME
COMPLISHED
THE 'IMPOSSIBLE'."

1935, at Columbus, undefeated Ohio State Notre Dame 13 - 12. It was Notre Dame's near Ohio's 30 yard line, second and ten, 60 seconds of play remaining. Then — a shift — and Bill Shakespeare let fly a set-like pass which Wayne Millner nabbed the shadow of Ohio's goal posts for the winning play that followed. The right play at right time had turned defeat into victory in 60 seconds.

Right play at the right time gains yardage. Surely, the right tap at the right time means better production. We can assist you in getting the taps best suited to your requirements through our engineering service. It is your disposal. Write us today . . . our engineer nearest you will call . . . there will be no question. The Wood & Spencer Co., 1921 East St., Cleveland, Ohio.

"The Right Tap at the Right Time"



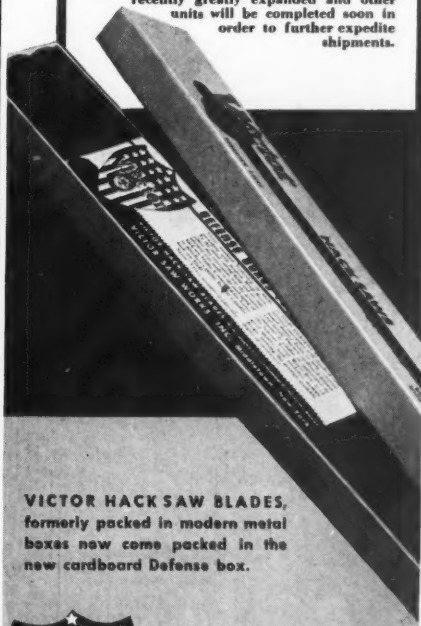
DEFENSE BOXES for Victor Blades

In helping the Nation's defense efforts, we here at Victor Saw Works, Inc., proudly accept our responsibility by changing from modern metal containers to packing Victor Hack Saw Blades in cardboard boxes in order to help conserve vital defense.

In appearance the new cardboard Defense box is similar to the modern metal container. It is of durable quality, attractively designed, and in use will give the greatest available degree of satisfaction.

Due to the National Emergency and the unprecedented demand for Victor Hack Saw Blades, orders have been somewhat delayed during the past few months.

May we take this opportunity to thank you for all considerations shown and to assure you that we are doing everything humanly possible to insure prompt shipment of Victor Blades. Our production capacity has been recently greatly expanded and other units will be completed soon in order to further expedite shipments.



VICTOR HACK SAW BLADES,
formerly packed in modern metal
boxes now come packed in the
new cardboard Defense box.



VICTOR SAW WORKS
INC.

Middletown

New York

SHATTER-PROOF!

GRIFFIN

SOFT CENTER

HACK SAW BLADES

These shatter-proof blades contain all the good features of the best blades but none of their faults.

HARD BACK

... to give the *stiffness* of all-hard blades.

Soft, Tough CENTER

... to give the *freedom from breakage* found in soft-back blades.

VERY HARD TEETH

... to give the best of *wearing and cutting* qualities.

Other Griffin blades are: High Speed Steel, Special Alloy, standard All-Hard, standard Soft-Back, and Non-Strip.

Write for complete details.

Manufactured by

G. W. GRIFFIN CO.
FRANKLIN N. H.

General Sales Agents

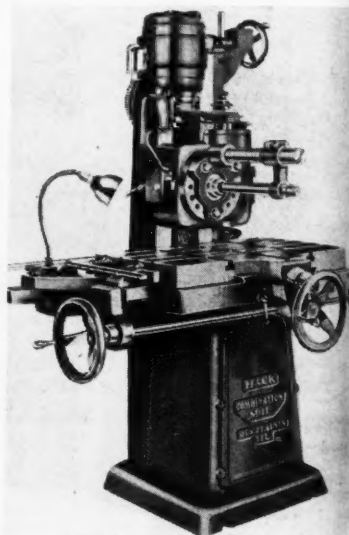
**JOHN H. GRAHAM
& CO. INC.**

105 Duane St., NEW YORK, N. Y.

the column have been eliminated.

The Combination Miller has been designed to meet the needs of defense production especially as it relates to aluminum alloy castings of more than average proportions and of ferrous materials weighing up to 1,000 pounds.

A large work table used in conjunction with Vernier scales makes possible the precision milling of such parts with comparative ease, and boring operations



Hack Combination and Horizontal and Vertical Milling Machine

can be performed in fairly large as well as small diameters due to the fact that the spindle can be operated in both gears as well as open belt. The Combination Miller is available in both normal and high speed models with speeds from 60 to 2,500 revolutions in the normal speed machine and 1,500 to 6,000 in the high speed machine.

Any of the Simplex attachments can be used on the combination mill but is regularly furnished only with the vertical head, over-arm unit, milling table and miscellaneous wrenches.

Improved Presto Tool Holder

The Presto Tool Mfg. Co., 12234 E. 14th Ave., Detroit, Mich., is now marketing the Improved Presto Tool Holder which

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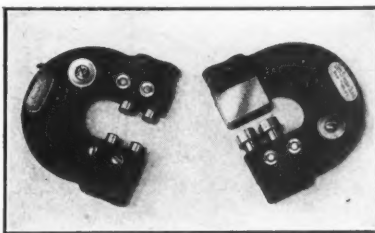
October, 1941

ATLANTIC ADJUSTABLE LIMIT SNAP GAGES FOR INSPECTION OF DEFENSE PRODUCTION

Atlantic Adjustable Limit Snap Gages are being used to inspect defense production in leading plants throughout the country. Made to American Gage Design standards, Atlantic gages are fully guaranteed for accuracy and workmanship. Write today for bulletin fully describing the various types and sizes of snap gages available.

MEEHANITE CASTINGS

Gage frames are made of Meehanite Castings, a special material selected because of its high tensile strength. Atlantic Gage frames retain original form without shrinking or warping.

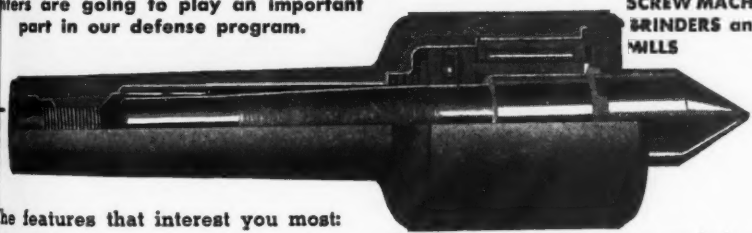


GEORGE SCHERR CO., Inc. 130 LAFAYETTE ST. NEW YORK, N. Y.

THE CENTER OF ATTRACTION

Chemical Live Ball and Roller Bearing centers are going to play an important part in our defense program.

For LATHES, HAND SCREW MACHINES, DRINDERS and MILLS



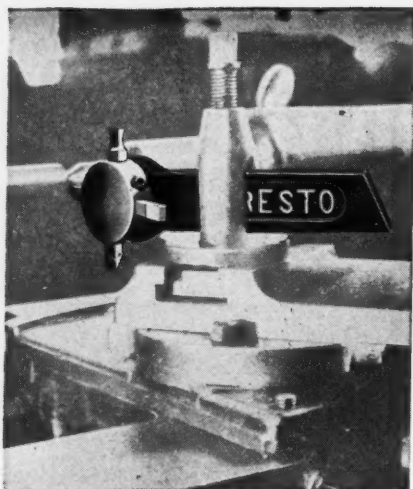
The features that interest you most:

- 1. Simplicity, sturdiness, and heavy duty.
- 2. 50% more radial load carrying capacity than the average live center.
- 3. Large spindle, small head, short overhang most desirable for rigidity and to be free from chatter.

- 4. With aid of cap screw you can lock spindle to redress point right in your machine.
- 5. Special oil seal to retain lubricant and keep out foreign matter.
- 6. A compression pad to compensate for heating and expansion of metal as a safety factor, with reasonable diligence exercised.

A folder giving prices and complete details will be mailed to you upon request. A ten-day trial. If not perfectly satisfied, your money will be cheerfully refunded.

MOTOR TOOL MFG. CO. 12282 TURNER AVE, DETROIT, MICHIGAN



Improved Presto Tool Holder

in the illustration.

The shank of the tool holder is case hardened, and the holder is equipped with a head in which four tool bits can

be held. The tool bits can be individually set for the correct height, holes in the turret head for the tool bits now being $\frac{3}{8}$ x $\frac{1}{2}$ inch.

The indexing is said to be accurate and operates as follows: the nut which holds the head to the shank is loosened then the turret is turned clockwise until the required tool snaps into the head and thus into position. The nut is tightened again, and the tool is ready for work. The tool is thus easy to set, compact in size, and is said to be accurate.

Hack Simplex Milling Machine

The Hack Simplex Milling Machine is a product of Hack Machine Co., Plainfield, Ill., and formerly known as Hack Multi-Versal, has been redesigned to include a number of improvements. A single red button at the local push button station will now stop function of the machine simultaneously. Another improvement consists of electrical safety provisions including an electric limit switch to control longitudinal travel of the table and double push button protection against the accidental starting of the reciprocating ram movement.

MORE and MORE



Users are coming to Acme for their jig bushings. Buying bushings releases your men for more important work, and insures high quality because Acme bushings are made by specialists.



ACME INDUSTRIAL COMPANY

212 N. Laflin St.

Chicago, Ill.

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NOW PACKED IN DEFENSE BOXES

To help conserve vital defense metals, Clemson Bros., Inc., are abandoning their modern metal boxes and are packaging Star Hack Saw Blades in attractive and durable containers.

The new cardboard Defense container is similar in appearance to the modern metal box, is of good quality, and of attractive modern design.

During the past few months, delivery of orders has been somewhat delayed due to the National Emergency causing an unprecedented demand for our products.

May we take this opportunity to thank you for all considerations shown, and to assure you that our production facilities have been greatly expanded in order to further expedite shipments.

STAR HACK SAW
CLEMSON BROS., INC.
MIDDLETOWN, N. Y.

STAR HACK SAW BLADES,
formerly packed in the famous modern metal Clemson Boxes, are now packed in cardboard defense boxes.

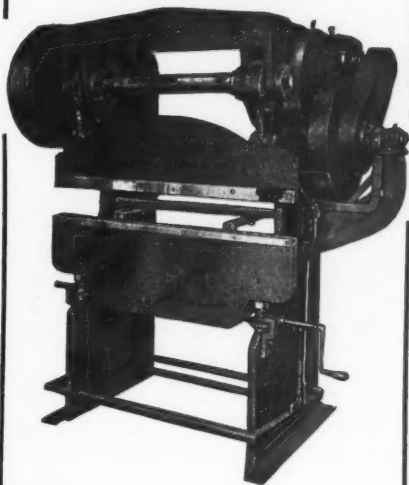


CLEMSON BROS., INC.

Middletown · New York

CHICAGO STEEL PRESS

No. 253



**Does 40% to 60% of the
forming work turned out
by the average shop.**

Here's a profitable, economical brake ideally adapted for rapidly forming metal sections such as in stoves, refrigerators, soda fountains, steel cabinets, metal furniture, steel boxes, and a great variety of sheet metal specialties. Its variable speed drive operates from 17 to 50 strokes per minute. The No. 253 CHICAGO STEEL PRESS is accurate, compact, and ruggedly constructed of highest quality materials.

Sizes 4, 5 and 6 ft. capacities up to 10 gauge.

Write for Circular No. 253

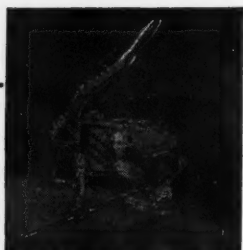
**DREIS & KRUMP MFG.
Company**

7418 LOOMIS BLVD.

CHICAGO

ILLINOIS

A
Midget
in
SIZE



A
GIANT
for
WORK!



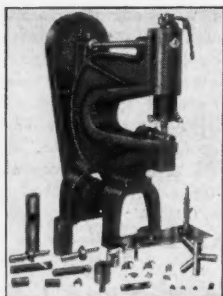
THE WONDER CUTTER

Cuts wire, rods or band iron easily and quickly. Any size wire or rod up to $\frac{3}{8}$ inch round or $\frac{3}{8}$ inch square and band iron up to $\frac{1}{8}$ by 2 inches. Its small size and low price makes it possible to have more than one, mounted wherever convenient. Gauge can be set for repeated cuts of same length on both wire or band iron. FREE TRIAL in your own shop. Write for further information and prices.

The Federal Foundry Supply Co.
4606 East 71st St. Cleveland, Ohio

SAVAGE NIBBLING MACHINE

FOR TUBE SLOTTING AND TUBE SHAPING—
FOR FAST AND ACCURATE CUTTING OF
FLAT SHEETS BY TEMPLATE OR TO A
SCRIBED LINE.



Showing Tube Cutting Attachments and Samples of Work

Manufactured by

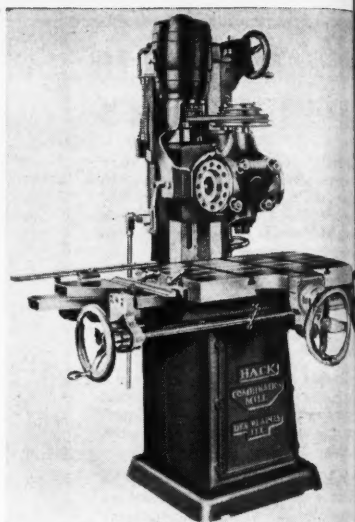
W. J. SAVAGE COMPANY
KNOXVILLE Since 1885 TENNESSEE
Pioneer Manufacturers of Nibbling Machines

Cutting Capacities
Flat Sheets Mild Steel $\frac{1}{4}$ "
Tough Alloys $\frac{3}{8}$ "

Tubing
Wall thickness to $\frac{1}{8}$ "
1" I.D. to 36" O.D.

Throat Depth
9" to 36"

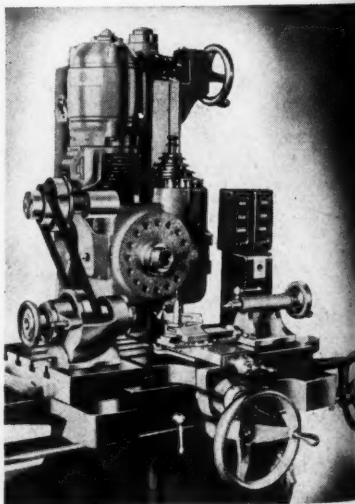
Ask for BULLETIN "F"



Hack Simplex Milling Machine

The machine has a reciprocating ram or column in which the head moves independently. In the design, four power feeds and one central position are provided by turning selective hand wheel provided for

Simplex Mill Set Up for Lathe Work



All Over the Map

of U.S.A. you'll find firms who are sending their tools
and production parts to us to treat.

Why?

Just one big reason:

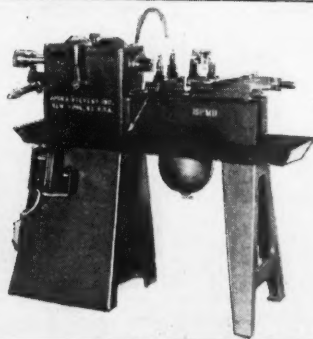
BETTER HARDENING — BETTER RESULTS

Perfection Tool & Metal Heat Treating Co.

1740-58 W. HUBBARD ST.

CHICAGO, ILL.

*Sing
a Song of
Profits*



Here are some interesting "notes" on the new, small, motor-driven STEVENS Screw Machine:

Conveniently located hand wheel permits advancing or retarding of stepless speeds while motor is running. Forward speeds, 150 to 1050 r.p.m. Reverse speeds approximately twice any forward speed. Clutch mechanism, housed in head, is operated by lever for forward, neutral or reverse movement of spindle.

Write for complete details.

STEVENS SCREW MACHINE

JOHN B. STEVENS INC. • 482 CANAL ST. • NEW YORK, N. Y.

MODERN MACHINE SHOP 261

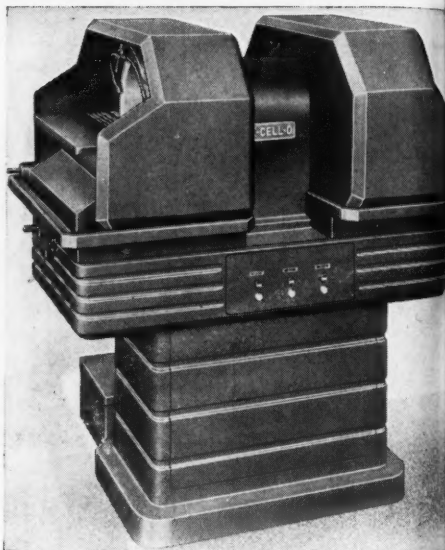
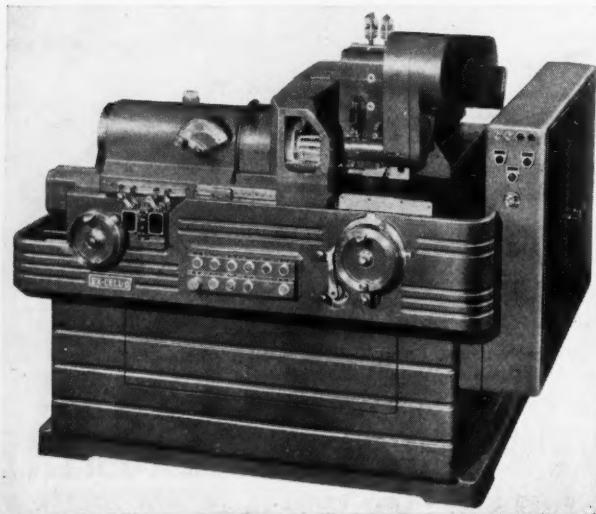
**Ex-Cell-O Style 49 Heavy Duty
14-In. Wheel Double End Tool
Grinder**

purpose, making possible vertical feed while the ram is reciprocating. Another feature is the super sensitive control of the ram for duplicating purposes through the duplicator control arm and wheel on the right side of the base.

To further the "all utility" principle for naval service on the high seas, army field service or installations for distant or isolated places where space is an important factor, special attachments are available for such services including (1) a bench lathe attachment with which small parts can be turned, (2) a turn table with an imposed compound slide for the end milling of intricate shapes, and (3) a radial drill attachment with a drilling capacity of 1 in. which permits the precision drilling of relatively large parts.

**Ex-Cell-O Thread and Tool
Grinders**

Ex-Cell-O Corporation, 1206 Oakman Blvd., Detroit, Mich., is in production



on two new products—a thread grinder and a tool grinding machine. The thread grinder—known as Style 39A—is for internally threaded work, and is automatic in operation.

The thread grinder grinds threads to 5 in. in length within a distance of 15½ in. from the work spindle to

Maximum hole ground is 9½ in. with a maximum of 1 in. Maximum swing is 18°. A taper attachment is available with the machine that allows grinding up to a maximum of 4 in. in diameter per foot of the effective thread length.

The 39A is one of eight standard precision thread grinders now bearing the Ex-Cell-O name, the various machines covering an exceptionally wide range in thread grinding work. A complete catalog on the 39A has just been

**Ex-Cell-O 39A Precision
Thread Grinder for
Internal Work**

"Accurate Engraving With Unskilled Operators" Engrave Iron, Soft Steel, Copper, Brass, Aluminum, Plastics on the Auto-Engraver



Flat or Round Surfaces

Write
for Complete
Details

\$195.00

Price Complete
Price Subject
To Change
Without Notice

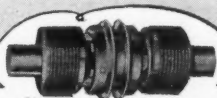
Letters are engraved from master type (block and script letters) furnished with machine. Also designs, emblems, signatures, etc., can easily be traced from original drawings. Engraves on flat and round surfaces. Vise capacity—4½"x15". Set-up quickly changed. After 30 minutes practice a novice can engrave perfectly.

AUTO-ENGRAVER COMPANY

366 FIFTH AVE.

NEW YORK, N. Y.

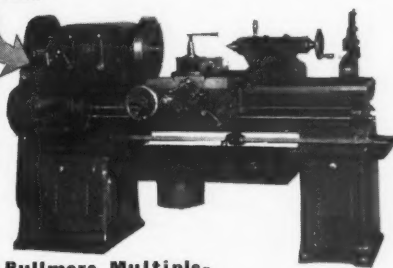
Pullmore Clutches



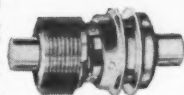
...considered best"
in Bradford Lathes—

The spindle-drive picture on page 9 in bulletin describing Bradford Geared Head Lathes shows No. 3 Double-Type Pullmore Clutch which is selected because "We consider it best suited to our purpose for size and power." This clutch, running in oil, does double duty. One side picks up the load smoothly, pulls positively, disengages cleanly. Continued movement of control lever engages the other pack of Pullmore multiple discs and brakes the spindle to a cushioned stop quickly.

Pullmore Clutches meet Bradford rigid requirements and all modern mechanical specifications. They are used in many other high-grade machine tools, and a wide variety of automatic and semi-automatic machinery. Investigate.



Pullmore Multiple-Disc Clutches are made in single and double types, for operation in oil or dry. Capacities range from 1 h.p. to 75 h.p. at 500 r.p.m. Write, today, for complete data.



Single-Type Pullmore

ROCKFORD DRILLING MACHINE DIVISION

Borg-Warner Corporation

300 CATHERINE STREET, ROCKFORD, ILLINOIS, U. S. A.

Center Clutches • Spring-Loaded Clutches • Pullmore Clutches • Power Take-Offs

39A Precision
Grinder for
al Work

October, 1941

MODERN MACHINE SHOP 263

sued and can be had from Ex-Cell-O Corporation.

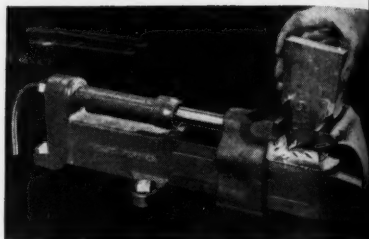
The other Ex-Cell-O product just announced is a Heavy Duty Double End Tool Grinder for carbides and tools of other materials. It carries 14-in. wheels, and can be equipped for either dry or wet grinding. This tool grinder—called Style 49—is the sixth and largest of the Ex-Cell-O line of carbide tool grinding machines. Ex-Cell-O Bulletin No. 46511 gives details on this grinder.

Studebaker Hydraulic Vise

A hydraulic vise capable of developing pressures up to 5 tons between the jaws has been introduced by the Studebaker Machine Co., 9 S. Clinton St., Chicago, Ill. The vise is designed to speed up small press and cutting operations as well as ordinary vise work, and is understood to have wide application on production lines, in tool rooms, and for maintenance.

The Studebaker Hydraulic Vise is operated entirely by foot control, permitting the use of both hands in setting up and removing work. The unit is self-contained, no outside power being needed.

Pressure to close the jaws is controlled by a foot pedal pump arranged



Studebaker Hydraulic Vise

in a pedestal located on the floor. The pedestal is connected with the vise proper by a steel tube through which the hydraulic fluid is conveyed to a ram behind the back jaw. Hydraulic pressure transmitted by means of the fluid moves the back jaw forward; the front jaw is stationary. Stepping on one pedal moves the vise jaw into contact with the work. A second pedal applies pressure up to 5 tons and a third is used to release the jaw.

The vise can be mounted horizontally on any type of bench as well as vertically on a wall or post. In addition, it can be mounted on a portable stand



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DIFFERENT FILES?
by Grobet

THE "ORIGINAL" SWISS FILE MAKER
(Immediate Delivery From Large Stocks)

The most complete catalog of its kind. Lists 5000 different shapes, sizes and cuts of GROBET Precision Swiss files. Learn more about these Chrome Steel Files that have won a reputation for utmost precision and durability.

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Ask also for catalog KM on Files for Filing Machines;
catalog KR on Rotary Files and Diesinkers' Burs

GROBET FILE CO. of AMERICA
3 PARK PLACE NEW YORK CITY

BETTER FILING!

MORE ACCURATE
WEARS LONGER!

ALSO FOR SAWING AND STONING

hundreds of shops, ILLINOIS Die Filing machines are turning out accurate work many years after their original purchase. Experienced diemakers who have operated various types of filing machines know that an ILLINOIS quality built throughout and will stand longer, while producing more accurate work. Write for descriptive literature today.

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Chicago, Illinois

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**DIE FILING
MACHINE**

Can't Get Taps?

If you're having trouble getting taps, you can make your present supply last longer by grinding them on a HYBCO Tap Grinder.

This machine lengthens the lives of taps two to five times. Three models with two sizes for each.

REASONABLE
DELIVERY

**HENRY P. BOGGIS
& COMPANY**

210 ST. CLAIR AVE., N. W.
CLEVELAND, OHIO

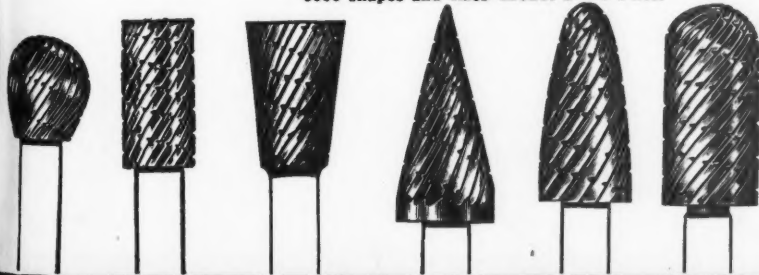


Grobet

Rotary Files GROUND FROM THE SOLID

Ask for Catalog KG, the most complete catalog of its kind, illustrating hundreds of rotary files hand cut, milled cut, ground from the solid; also counter sinks and diesinkers' burs.

Also ask for Catalog K.F.; illustrating 5000 shapes and sizes Grobet Swiss Files.



GROBET FILE CO. of AMERICA

3 PARK PLACE
NEW YORK CITY

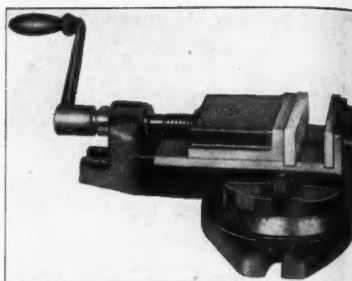
a movable, self-contained unit. Special jaw faces can be applied.

Construction is semi-steel throughout. The hydraulic pump is precision fitted to ensure accurate operation and long life. The sliding jaw and base are accurately machined to ensure accurate fit of the two jaws. Pump and ram cylinders are honed and polished.

Features of the tool are the speed with which it can be operated, the force which is centered in the jaws and not under them, work accuracy due to the precision fit of the jaws, absence of the protruding handle, and the fact that the vise can be mounted as a fixture on the machine table. The vise is available in two sizes; with 5-in. or 7½-in. width between jaws.

"Modern" Vises

The swivel vise and cam vise shown in the illustration herewith have been placed on the market by Modern Tools, East Berlin, Conn. The swivel vise is precision built and is designed for milling machine, shaper, and drill press work. The base is graduated in degrees and is provided with square key slots ⅝ x ⅛ in. deep. The vise can be



"Modern" Swivel Vise

used without the base if desired.

The "Modern" Swivel Vise is equipped with a hardened alloy screw and hardened and ground jaws and features semi-steel casting throughout. The jaw of the unit is 1 in. wide, 1½ in. deep, and has a maximum opening of 3 inches.

The "Modern" Cam Vise is also precision built for rapid production work on milling machines, shapers, and presses. It is quick-acting and rugged design, with cam parts of forged. The vise has a hardened

HIGH SPEED FINISHING OF FLAT SURFACES

Tight pulley for belt drive or extended base and direct motor drive.

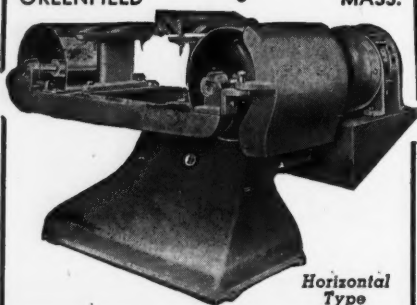
Made in three sizes—9", 14" and 20".

Other types Vertical and Horizontal for flat or round work. Write for details.

PRODUCTION MACHINE CO.

GREENFIELD

MASS.



Horizontal Type

LINLEY Noiseless Rotary Rivet Spinning Machine

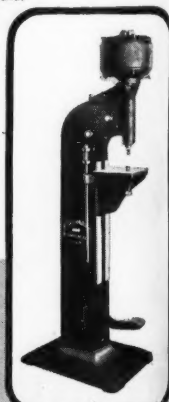
Made in a wide range of sizes and types for hot or cold rolled steel rivets up to ¾". Also for rivets of softer materials.

3½% chrome nickel steel spindles, heat treated and ground, are supported at lower end in a double row radial thrust bearing which carries radial load and riveting thrust load.

SEND SAMPLES
FOR
ESTIMATES

LINLEY
BROS. CO.

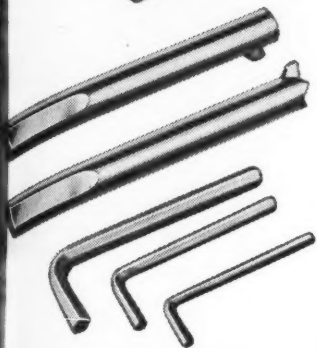
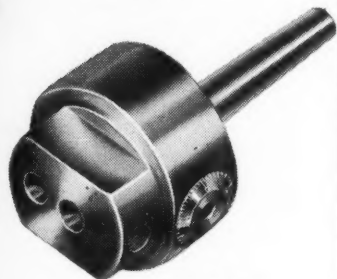
15 MONTAUX ST.
BRIDGEPORT, CONN.



FRAY

MICROMETER

OFFSET BORING
HEADS



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MACHINE TOOL CO.

MAKERS OF

"ALL ANGLE"

MILLING MACHINES

AND

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GLENDAL, CALIFORNIA, U. S. A.

*Save Time
Save Money*

By Ordering
CIRCLE TIP

STANDARD

**Tungsten Carbide
Tip Tools**

By ordering *standard* Circle Tip Tools instead of "specials," you can save much valuable time. If you will send us your requirements, we may be able to replace a special tool with one of our standard tools that will give you extra profits in much faster delivery time.

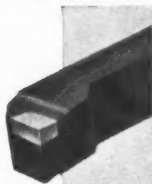
We also carry a complete stock of *standard* Circle Tip Tool Blanks for brazing on your shanks when making your own tools.

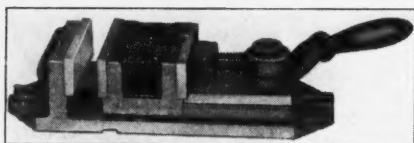
*Write for sizes
and prices.*

CIRCLE TIP TOOL CO.

EAST ORANGE

NEW JERSEY





"Modern" Cam Vise

steel screw and handle and hardened and ground jaws, and employs semi-steel castings throughout. Square key slots are provided in the base.

The Modern Cam Vise is available



TO INSTRUCT NEW MEN IN THE HANDLING OF DIAMOND TOOLS

we will send you a
valuable booklet. No charge,
no obligation.

KOEBEL DIAMOND TOOL CO.
9346 Grinnell Ave., Detroit

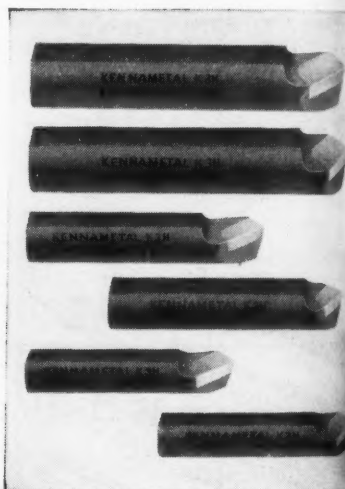
KOEBELITE DIAMOND TOOLS

Multi-Point, Multi-Set, Multi-
Edge, and Single Set. Diamonds for
all Industrial Purposes.

with two sizes of jaw, one having width of 4 in., depth of $1\frac{1}{2}$ in., maximum opening of 2 in., and other, a width of 5 in., depth of $1\frac{1}{2}$ in. and maximum opening of 3 inches.

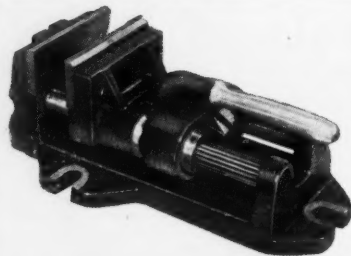
Kennametal Styles 27-R and 29-R Boring Tools

A series of standard Kennametal boring tools with round shanks, to known as Styles 27-R and 29-R,



Various sizes of Styles 27-R and 29-R Kennametal boring tools. The Style 27-R tool is shown at the top of each group.

been announced by McKenna Metal Company, 300 Lloyd Ave., Latrobe, Pa.



Quick-Acting PRESTO - VISE

Sliding jaw is moved up to work with lever in raised position. Lever is then pressed downward to exert desired pressure on part being clamped. To release, lever is raised which disengages clutch and slide moves away from work. Write for complete details.

D. A. SMITH & CO.

8085 LIVERNOIS

DETROIT, MICH.

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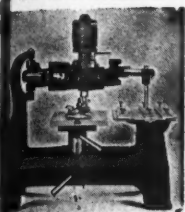
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OIT, MICH

October, 1941

For Defense Production...



PANTO COMBINED ENGRAVER, ELECTRIC MARKER, and ACID ETCHER

Compact pantograph-
bench-type machine, with interchangeable
heads, for wide range of work. Illustration
shows engraving head attached.

CUTTER GRINDER

Accurate inexpensive unit for sharpening
single-flip engraving and routing cutters.

MASTER COPY TYPE

2 and 3-dimensional brass and 3-dimensional
plastic, for engraving, marking, die cutting.

CUTTERS AND ENDLESS BELTS FOR ALL TYPES OF ENGRAVING MACHINES

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H. P. PREIS ENGRAVING MACHINE CO.
49A SUMMIT ST. NEWARK, NEW JERSEY

An "All-Out" Aid
for a Dust
Defense!



CLEMENTS CADILLAC

PORTABLE ELECTRIC

BLOWERS & SUCTION CLEANERS

A Clements-Cadillac will be your mightiest
weapon against breakdowns, costly delays,
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MADE IN 5 POWERFUL MODELS

ASK FOR A 10 DAYS FREE TRIAL OFFER.
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ALL SIZES AND STYLES



Fabricators of all types of
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Cabinets, Shelving, Etc. Write for general catalogue.

Sheet Metal Plant

EAST 49th and HARVARD AVENUE

Spring Plant

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THE CLEVELAND WIRE SPRING CO. • CLEVELAND, O.

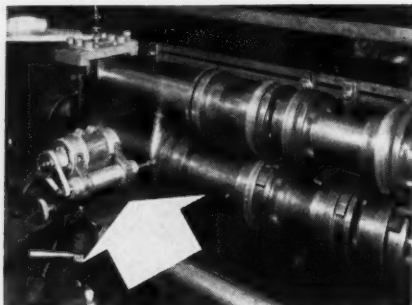
These tools have the same tool angles as other standard Kennametal boring tools, a feature of which is the 12 deg. positive back rake to compensate for the negative effect of the tool being held at height one-half the height of the shank above center. Style 27-R tool is for use in 30 deg. boring bars, and Style 29-R tool is for use in 45 deg. boring bars. They are supplied in common shank sizes, the tolerance on the round shanks being plus 0.000 minus 0.001 inch.

Styles 27-R and 29-R Kennametal tools are tipped either with Kennametal grade KM, the most widely used grade

for machining steel, or with Kennametal grade K3H, the very hard grade used for precision boring and finishing of all types. Because these two styles have been classified as Standard Kennametal tools, shipments are made within ten days of receipt of order.

Tompkins-Johnson Production Rivet Setting Machine

A production rivet setting machine especially designed for use in the aircraft



Themac Tool Post Grinder grinding slitting knives "in place." Setting grinder in this way instead of tearing down rollers saves one full day's time.

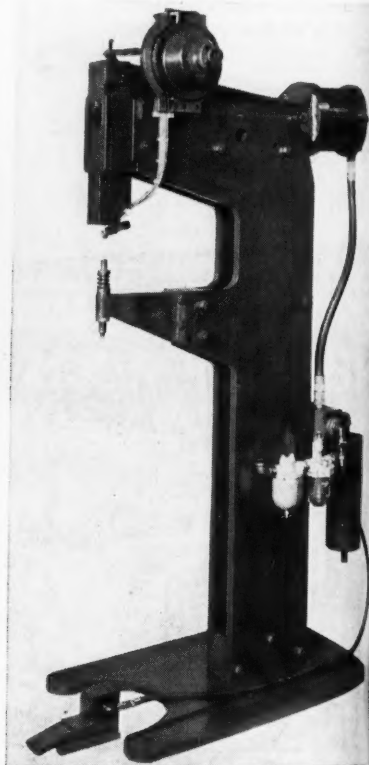
PRECISION GRINDERS

These high speed, portable, electric grinders with circumferentially adjustable grinding spindles are the most practical and modern equipment available. Their exclusive features readily adapt them to shop equipment. They can perform any grinding job on any size lathe. Write for complete catalog.

The McGonegal Mfg. Co.

135 Mozart St.

East Rutherford, N. J.



Tompkins-Johnson Production Rivet Setting Machine

industry has been developed by the Tompkins-Johnson Company, 620 N. Michigan St., Jackson, Mich. In the operation of this machine pressure for setting the rivets is supplied by an

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October, 1941

"NEW D & W" MAGNETIC CHUCKS

Styles 7 x 17 and 6 x 13



Developed to meet demand for
chucks lower than our standard
style.

*Send for folder covering
Chucks and Demagnetizers.*

J. & H. ELECTRIC CO.
202 Richmond St. Providence, R. I.

Used by machine operators as successfully as inspectors **COMTORPLUG**



gages bores to fractions
of .0001" showing size,
front or back taper, out-
of-round, barrel shape,
bell mouth, etc.

Made in sizes $\frac{1}{4}$ " to 7" dia. and larger,
Comtorplug **AUTOMATICALLY** gives accu-
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users, both operators and inspectors. Wide-
ly used in airplane, automotive, ordnance
and precision industrial work.

Request Bulletin 27

THE COMTOR CO.
64 Rumford Ave. Waltham, Mass.

DRIVES

Cullman

Your Lathes, Shapers, Milling
Machines and other belt driven
machines can now be easily
motorized with direct drives.

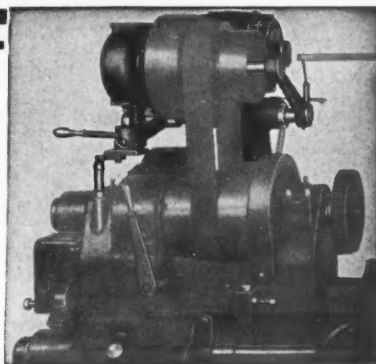
CULLMAN DRIVES are rigidly
constructed, easily installed
and simple to operate.

Made for motors from $\frac{1}{4}$ to 15
H.P.

CULLMAN WHEEL CO.

**1334-V ALTGELD STREET
CHICAGO, ILLINOIS**

Send For Information



MODERN MACHINE SHOP 271

cylinder and is stepped up through a toggle mechanism. This familiar "air squeeze" action is combined on this machine with an automatic feed feature which before this has been seen largely only on electrically powered riveting equipment.

The rivet sets and rivet jaw construction which are of new design make possible an excellent job of flush riveting. The machine is capable of setting up to $\frac{1}{4} \times \frac{3}{4}$ in. long aluminum alloy rivets. Tooling designs in some cases do not permit setting the longer length rivets, in which case the length is subject to

limitation by required tooling design. The Rivitor is available in 9, 12, 16, 18, 20, 22, 24, 28, 30, 32, and 36 throat depths. The ram stroke is 1 inch. The machine is equipped with a 2-inch diameter air cylinder. Recommended pressure is 60 lb. per square inch. Lower pressure may be used, depending on the size of the rivet.

U. S. Vertical Explosion Proof Motor

U. S. Electrical Motors, Inc., 200 Slauson St., Los Angeles, Cal., is now marketing an explosion proof motor. The motor is suitable for vertical applications in both Class I, Group D and Class II, Group G locations as defined by the National Board of Fire Underwriters. The first class are those locations in which flammable substances are present. The second class includes locations in which combustible dust is present.

The motor is fan-cooled and has bestos protected windings, a feature which is especially important since U. S. Explosion Proof Motors are rated 100 deg. Centigrade rise or 37 per cent higher than U. S. Standard Motors. The vertical explosion proof motor is offered with a variety of mounting flanges. A mounting bracket is available to fit machines of any design without the use of additional adaptors or plates.

"Hisey" Combination Exhaust and Filter

The Hisey-Wolf Machine Co., Coler and Marshall Sts., Cincinnati, Ohio, has placed on the market the "Hisey

Gammons
REAMERS
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END MILLS

SPECIALISTS in the
Relief Taper Pin Reamer
Special Reaming Problems looked
Immediate Shipment on Stock
Tools

SPiral SPECIALISTS
THE GAMMONS TOOLING CO. MANCHESTER CONN.

COMET Internal Threading and Boring Tools

For holes from $\frac{1}{8}$ " upwards 15" Different Sizes
The accurate thread angle is maintained through out
sharpening until tool is entirely worn down. See
head—long cutting surface for regrinding.

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DIAMOND WHEEL DRESSERS SET IN SINTERED TUNGSTEN CARBIDE



Single point elongated diamonds need no resetting when set in Sintered Tungsten Carbide.

Smaller Diamonds—Longer Life.

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DIA-TOOL INC.

YONKERS, NEW YORK

WHITNEY MILLING CUTTERS

*for Uniform Seating of
Whitney Woodruff-type Keys*



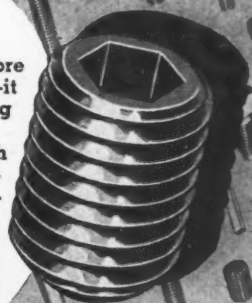
No need for skilled labor... or for filing and fitting... when Whitney Milling Cutters are used for seating Whitney Keys. Cutters are made in all sizes to correspond with the keys which can't roll over. Complete information in Catalog V-111. Write.

The Whitney Chain & Mfg. Co.
HARTFORD, CONNECTICUT

Need MORE Mac-its? ... here's a way

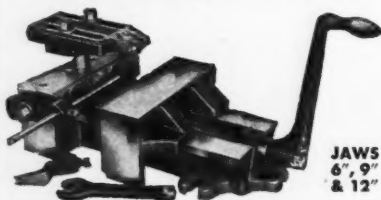
With Defense orders calling for more and more alloy steel screws, Mac-it machines are kept busy producing at top speed. You can get more Mac-its—through increased production—by specifying standard sizes wherever possible.

Fewer sizes mean fewer machine changes and longer running time. So get your orders placed now for future delivery by calling your distributor today.



THE STRONG CARLISLE & HAMMOND CO., Cleveland, Ohio

**Also a precision jig
of many uses!**



**JAWS
6", 9"
& 12"**

GRAHAM MULTI-PURPOSE VISE

for Miller, Planer, Shaper, Drill Press

Sold Plain, or with Attachments which make it a many-use jig. If bought Plain, can add Attachments later. Get Circular A.

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GRANT

Noiseless Spinning Riveters

**2 to 4
Spindles**

Head rivets from smallest to 3/16" diameter.

Built with automatic trip or foot operation.

Other types include Double-Spindle Horizontal and Single-Spindle Vertical Noiseless Rivet Spinning Machines, and Single-Spindle Vertical Hammer type Riveters.

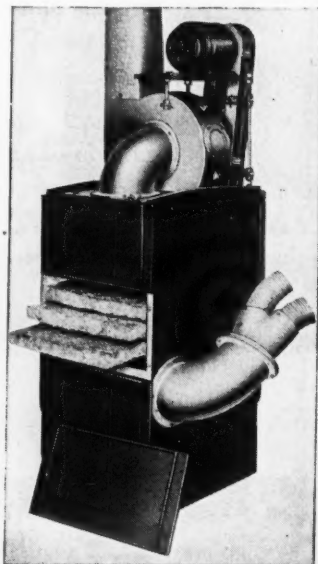
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The GRANT MFG. & MACHINE Co.

96 Sullivan Ave.
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Combination Exhauster and Filter shown in the illustration. Dust laden air enters a cyclone collector removing coarse particles and, after passing through impingement-type filters which arrest the fine dust, is said to be so clean that it can be recirculated in the room after leaving the fan of the unit. The motor is externally mounted, thus assuring cool and clean operation.

A handy clean-out is provided for heavy particles which are carried into



"Hisey" Combination Exhauster and Filter

the unit. The filters are readily removed for cleaning by shaking. The large fan and motor with which the Hisey Combination Exhauster and Filter is equipped provide high static pressure yet are comparatively quiet in operation.

Johnson Metal Cutting Band Saw

A metal cutting band saw of the horizontal type has been announced by Johnson Machine Works, Inc., Albion, Mich. Features of the machine are extreme rigidity and hydraulic control of the feed.

The band wheels are housed in a box-

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Dust lader
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Industry's Newest Tool . . .

MEAD BANDSANDER

It is a time, labor and money saver on innumerable jobs in any shop. Sharpens tools, cutters, etc., of many "kinds." F.O.B. Chicago, \$14.95.

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**Why Use A Shaper
to cut Keyways when a**

DAVIS KEYSEATER

**will do the
job so much
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better?**

Send
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DAVIS KEYSEATER CO.

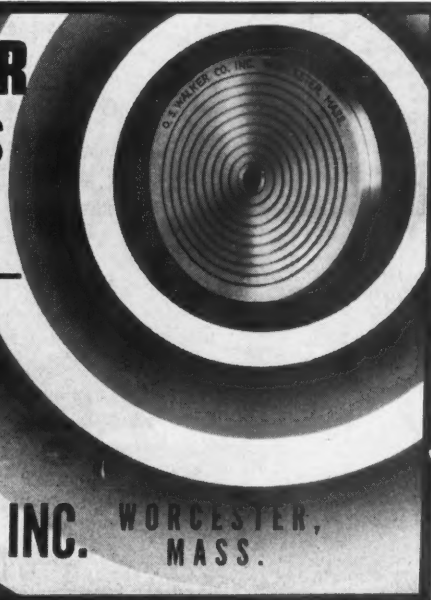
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ROCHESTER, N. Y.

WALKER MAGNETIC CHUCKS

**THE BEST WAY
TO HOLD MOST WORK—
THE ONLY WAY
TO HOLD SOME OF IT**

Ask for Circular W4

**O. S. WALKER CO., INC. WORCESTER,
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October, 1941

MODERN MACHINE SHOP 275

SpeedWay

1" DRILL

2

NATURAL GRIP
THURST LINE
END THURST

REMOVABLE
SIDE HANDLE

\$27⁵⁰

AIR COOLED
DIE CAST CASE

GUARANTEED
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SELF-ALIGNING
ROLLER BEARING

«Don't let the price fool you. This is a real full capacity industrial $\frac{1}{2}$ " drill—a handier, more powerful and all-around better drill than many costing a third more. Specially wound, high torque, forced-air cooled long-life motor. Improved design breast plate end handle—at last, a "natural grip" handle that applies thrust in a direct line with the drill point, and all the features common to other quality drills—oilless bearings, sliding thumb switch, streamlined die cast case, removable side handle, waterproof cord and unbreakable plug.

SPEEDWAY MANUFACTURING CO.
1825 So. 52nd Ave., Cicero, Ill.

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TIME-SAVER
IN DEFENSE
INDUSTRIES**



Soft Rubber
Wheels
Disks
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Sticks

for POLISHING and FINISHING METALS

The SOFT RUBBER binder CUSHIONS the abrasive.

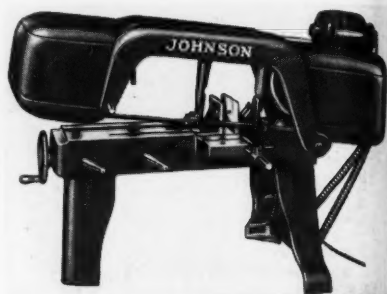
The product of a thousand uses. Speeds up finishing and polishing after grinding and abrasive operations. Nothing like it! Clean, easy to handle. Leaves a bright, smooth surface.

Prompt Deliveries—Order from your mill supply house.

BRIGHTBOY INDUSTRIAL DIVISION
WELDON ROBERTS RUBBER CO. NEWARK, N. J., U. S. A.

type frame, making for rigidity, accuracy of cut, and long blade life. The wheel assemblies are mounted on welded steel hangers which are bolted to the frame. The frame is designed for three point suspension; thus the machine is always evenly supported and will operate accurately even when located on uneven floor surfaces.

Power is transmitted through a worm and gear reduction to the rim of the wheel, precluding the possibility of chatter. All shafts operate in ball bearings.



Johnson Metal Cutting Band Saw

and gears run in oil. The entire blade section, excepting the teeth, is supported on wide guide rolls which promote extreme accuracy. The band wheels are 16-in. diameter, providing for a large amount of area for the blade to "wrap" on the wheel and eliminating slippage. The wheel axles are unusually large in diameter and the wheels revolve in heavy, grease-packed, auto-type roller bearings.

The unusually wide bed provides increased working space and rigidity. Power is supplied through a ball bearing motor which will operate in tilted position. Four speeds are available, providing maximum efficiency for the cutting of any kind or type of metal. The bolt-action stock stop recedes during the cut, preventing the cut section from binding and damaging the blade. Hydraulic control of simple design ensures positive feed at all times. A "quick-acting" vise is provided which is controlled at the normal operating position. All parts are fully guarded.

Blades are 11 ft. 5 in. x 21 gauge $\frac{1}{8}$ in. and are available in from 6 to 32 teeth per inch. Height to top of table, 24 $\frac{1}{2}$ in. Overall height, 39 $\frac{1}{2}$ in. Floor space required, 66 x 32 in. Capacity, 10-in. rounds, 18-in. flats.

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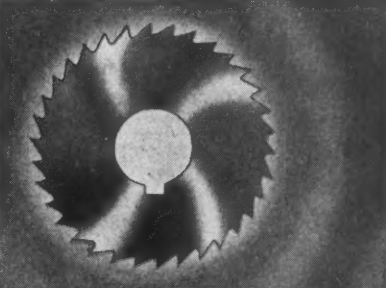


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**AUTO MOULDING
& MFG. CO.**

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CIRCULAR SAWS

Made in high speed steel — $\frac{1}{4}$ " to 10" diameter.
Also special saws.

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CIRCULAR TOOL CO., Inc.
767 ALLENS AVENUE • PROVIDENCE, R. I.

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DAYTON CLEVELAND SYRACUSE
INDIANAPOLIS DETROIT ST. LOUIS

Luers Cutting Off Blades and Holders are reducing our cutting off operations by half. This tool is a combination of many good principles, and fills a long felt need in the machine shop.

We have driven these Cutting Off Blades into forged stainless steels and bar stock for hours at a time under power feed without grinding.

Produced under license issued by
John Milton Luers Patents, Inc.

Are You Satisfied with Your Present CUTTING-OFF TOOLS?

Read what this nationally known manufacturer says about Luers patented cutting-off blades and holders.

Eliminate 90% of All Cutting-off Troubles with Luers Cutting-off Tools

They reduce friction in three important ways. The tapered blade provides adequate back clearance. The T-shaped section develops less side friction. The curved chip is free to expand and does not block the cut. Other important features pictured and described in literature.

WRITE FOR LITERATURE

Tell us the make and model of your equipment. You will receive full information promptly.

EMPIRE TOOL CO. 8790 GRINNELL AVE.
DETROIT, MICHIGAN

October, 1941

MODERN MACHINE SHOP 277

G-E Fractional - Horsepower Motors for machine tools and other industrial applications are illustrated and described in Bulletin GEA-3579 announced by the General Electric Co., Schenectady, N. Y. Copy free upon request.

Sound Motion Pictures for Machine Job Training

To meet the increasing need for aids for use in training apprentices and machine shop operators, Film Productions

Company, 1504 Hennepin Ave., Minneapolis, Minn., has completed a series of eight sound motion pictures especially made for use in training apprentices in machine shop practices. These films are intended to supplement practical shop training, enabling the student to obtain an understanding of the basic fundamentals of machine shop operations in a minimum of time. Tests of the value of visual instruction have shown that 26 per cent more is learned and 38 per cent more is remembered through this method of training.

The series of films includes eight subjects in twelve reels covering Metal Cutting Principles, Precision Layout and Measuring, Jigs and Fixtures, Die and Die Making, Lathe Operation, Planer and Shaper Operation, Milling Machine Operation, and Grinding. These films make it possible for the student to see photographic close-ups of the intricate methods of procedure. Animated drawings, microphotographs and direct photographs make these techniques easy to understand.

Each subject is treated in such a way that the individual film subject may be used separately. The text outline is available for use by the instructor in presenting the film. These films are already in use in a number of industrial plants in the principal metal manufacturing centers, also as a part of the training equipment in trade and manual training schools.



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The "Engineering Encyclopedia" sup

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ROTARY POWER CUTTERS

"Ground from the Solid after Hardening"

DESIGNED AND SERVICED BY

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GITS Oilers

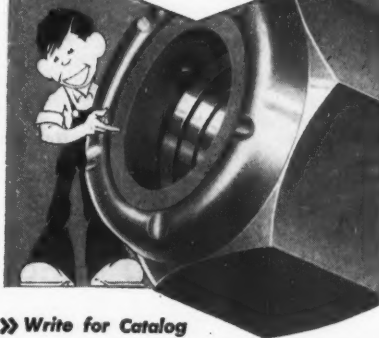


• Your lubrication problems, whether large or small, will find the correct answer in the Gits Line. If your requirements are of special nature, send us your specifications.

GITS BROS. MFG. CO.

10 years of oil cup experience
1846 S. Kilbourne Ave. Chicago, Illinois

See this self-locking nut
at the
**NATIONAL METAL
EXPOSITION**



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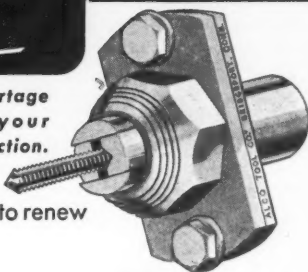
ELASTIC STOP NUT CORPORATION
2327 VAUXHALL ROAD • UNION, NEW JERSEY

Elastic Stop **SELF-LOCKING
NUTS**

NATIONAL Economy

demands conservation of tools and the existing shortage of taps makes this **ALCO TAP HOLDER** your one best bet for economical, uninterrupted production.

Adjustable concentric alignment—no broken taps to renew
Even wear on taps assures longer tap life
Elimination of bushings saves bushing costs
Simplicity of adjustment permits time saving in changing tap sizes—change overs—and set up.



Standardize on **ALCO** for every drilling, tapping, reaming, and thread cutting requirement.

ALCO TOOLS

THE ALCO TOOL COMPANY

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plies, in condensed form, the essential facts about 4,500 standard and special engineering subjects. Although intended primarily for reference purposes, the encyclopedia is designed to give students, whether young or old, a broad fund of knowledge relating to the outstanding subjects in many different branches of engineering.

In general, the encyclopedia consists of concise treatises ranging from short paragraphs to several pages in length. These deal with various important mechanical laws, rules, and principles; physical properties and compositions of

a large variety of materials used in engineering practice; the characteristic features and functions of different types of machine tools and other classes of manufacturing equipment, and many other subjects. The treatises are accompanied by definitions of numerous trade and technical terms used in engineering and manufacturing.

By way of illustration, subjects include information on which of the four American Standard screw thread fits is recommended for most interchangeable screw threads; why some tool steels are designated as "finishing" steel; flame-hardening and flame-softening; how to lay out hobs for hobbing spline shafts; the American Standard sizes for mechanical drawings; why the use of "preferred numbers" is advocated; the meaning of commercial wire classifications, such as bright wire, merchant wire, market wire; the distinguishing features of an Aero-thread; the meaning of the octane number of gasoline; and so on.

All matter is arranged alphabetically under the heading or word likely to be referred to, thus making the encyclopedia self-indexing. Whenever a subject might properly be placed under more than one heading, such additional headings are included with suitable cross references. There are also many cross references to whatever subjects may be closely allied to any given subject.

The Design of Manufacturing Enterprises. By Walter Rautenstrauch. Published by Pitman Publishing Corp., 2 W. 45th St., New York, N. Y. 298 pages. Cloth binding, board covers. Price \$3.50.

Profitable operation of large and small manufacturing businesses is dependent on their efficient economic design. "The Design of Manufacturing

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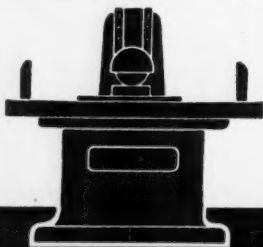
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basis. The first part of the book deals with business as a whole; the second with selected problems.


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"Plant Protection for National Defense." How to counteract the triple threat of fire, theft, and sabotage is revealed in "Plant Protection for National Defense," a 32-page manual published by Detex Watchclock Corp., 71 Varick St., New York, N. Y. Written in collaboration with the country's foremost authorities, the manual contains rules, regulations, and instructive information for the guidance of watchmen, guards, and supervising personnel. In the light of the National Emergency, the manual includes vital instructions for coping with a menace confronting American manufacturers—sabotage.


Half of the manual is directed to management and half to watchmen themselves. Some of the topics discussed are what type watchmen a company should employ, how to train watchmen, the use of firearms, how a tour of inspection should be patrolled, and what to do in specific emergencies. The foremost supervisory systems for controlling and regulating the activities

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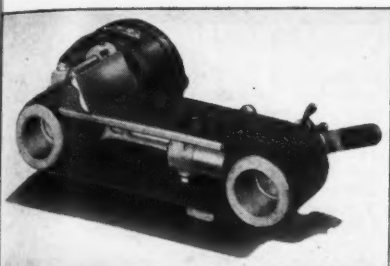
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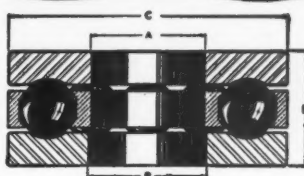
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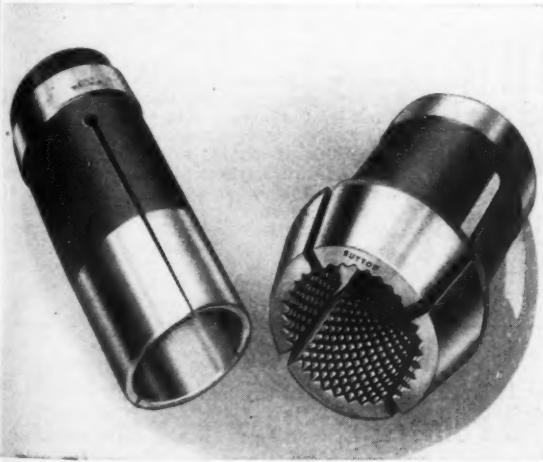


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Sutton Feeders (with long-life spring Diamond Serrations).

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October, 1941

MODERN MACHINE SHOP 283

of watchmen are also discussed.

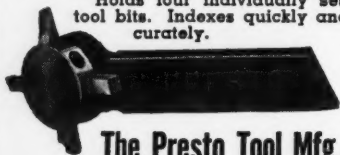
A considerable portion of the manual is devoted to fire extinguishing equipment, how it operates, and which type to use on which type of fire.

Some of the chapter headings are: The Watchman's Route; Organization of a Company Guard; Tips to Management; What is Sabotage; What is Espionage; What Every Watchman Should Know; Safety Thoughts, and so on.

Anyone responsible for the safety of plant and property can obtain a copy of the manual by writing to the Detex Watchclock Corp. at the above address.

The Tool for YOUR Production

Holds four individually set $\frac{1}{8}$ " tool bits. Indexes quickly and accurately.



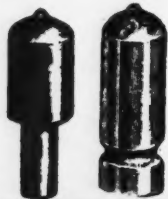
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Trade Literature

"Catechism of Electrical Machinery."

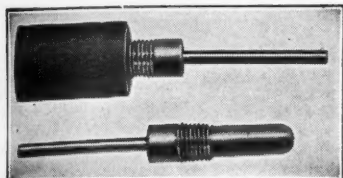
Those who are not familiar with electrical phenomena or terminology can acquire a good working knowledge by reading the 48-page "Catechism of Electrical Machinery," recently published in a revised edition by Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Illinois.

The "Catechism" begins by explaining electricity and magnetism as utilized in electric generators and motors, and goes on to discuss important electrical measurement. The principles of direct-current generators and motors are presented next, followed by an A-B-C examination of alternators and alternating-current motors. Illustrations, including simplified diagrams as well as photographs, are generously used as aids to clear understanding. Useful tables of practical application are included.

Address your request for a free copy of the "Catechism" on your business letterhead.

Ampcoloy Bronzes. Ampco Metal Inc., 1745 S. 38th St., Milwaukee, Wis., has issued a 16-page catalog describing its Ampcoloy series of bronzes. Among the Ampcoloy series are alloys of aluminum bronze, manganese bronze, beryllium-copper, high-conductivity, and high-lead alloys. The catalog is well illustrated with photomicrographs, photographs of parts, and factory scenes, and contains descriptions of the alloys as well as a comprehensive table of physical properties and range of chemical compositions. Many government specifications for federal, air corps, and navy use are listed. Copy of catalog free upon request.

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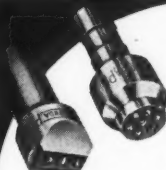


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Training in Welding. A pictorial booklet entitled "You and Your Job in Arc Welding" has been published by the Hobart Trade School, Inc., Troy, Ohio. The functions and courses of study pursued at the school are explained in this 12-page publication which may be obtained free of charge by writing the registrar of the school.

Nopak Cylinders. The Galland-Henning Mfg. Co., 2782 S. 31st St., Milwaukee, Wis., has made available to the trade a six-page bulletin which presents

Nopak Cylinders for air and hydraulic service. The outstanding feature of the bulletin is its large size and easy legibility of the detail drawings included in it. The drawings, together with the table of specifications which accompany them, give the prospective user of Nopak Cylinders complete technical data on each model. Copy free upon request.

Metaline Oilless Bronze Bearings. A complete catalog describing Metaline Oilless Bronze Bearings has been issued by the R. W. Rhoades Metaline Company, Long Island City, N. Y. It is arranged in three sections. One section describes the lubricating properties of Metaline; the second part outlines the various types and ranges of applications for oilless bearings, and the third presents detailed data for use in preparing specifications. Copy free upon request.

Tantung "G" Tools. Blades for inserted tooth milling cutters and "all purpose" type lathe tools with full width tips, made of Tantung "G," are listed in two bulletins issued by Vascology Ramet Corporation, North Chicago, Ill.

Tantung "G" is a non-ferrous alloy containing tantalum carbide developed especially for "borderline" machining applications between the ranges of high speed steel and cemented carbides. It has been found especially effective in increasing production of old machines and certain types of cutting operations. Tantung "G" tools are also obtainable in solid tool bits and "Economy" type brazed tools.

Bulletin G-408, containing drawings, dimensions and prices of nine popular types of milling cutter blades, and Bulletin G-409, containing specifications and prices of all-purpose type tools, will be supplied upon request.



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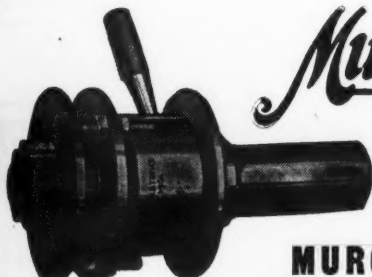
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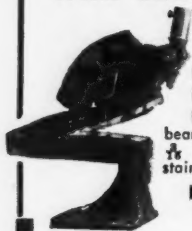
Also all styles of "Bolt and Pipe Threading Machines" and "Roller Pipe Cutting-Off Machines"

Kennametal Stock Sheet. A weekly stock sheet listing quantities of various standard style Kennametal Carbide Tools has been made available by McKenna Metals Co., 300 Lloyd Ave., Latrobe, Pa. Tools carried in stock are rough ground and tipped with Kennametal grade KM, the most commonly used grade for cutting steel.

B-C Hobbing Data Sheets Nos. 15 and 16 on the use of Barber-Colman Hobs and Hobbing Machines for cutting helical gears for the extensive line of motor

driven saws and drills built by Skiles Inc., Chicago, Ill., and on the sharpening of hobs, thread mills, and formed cutters at a tractor building concern by means of Barber-Colman Sharpening Machines are now available from the Barber-Colman Co., 207 Loomis St., Rockford, Ill. Data sheets free upon request.

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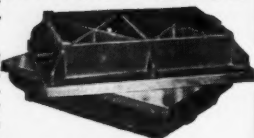
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Gorton Munitions Engraver. A four-page bulletin designated as Form 1511 and describing the Gorton Model M-2 Munitions Engraver has been published by the George Gorton Machine Co., 1210 Racine St., Racine, Wis. The bulletin, together with an insert, gives the machine specifications, samples of work with production times, accessories, assembly and lubrication charts, and an actual size work chart which permits a prospective machine purchaser to determine whether a job in mind will fit the machine. Copy free upon request.

Walker-Turner Flexible Shaft Machines. An eight-page bulletin describing various flexible shaft machines available for defense industries has been issued by the Walker-Turner Co. Inc., 604 Berckman St., Plainfield, N. J. Equipment for use in grinding, polishing, burring, and other operations necessary in the manufacture of airplanes, airplane engines and parts, marine engines and accessories, in the automotive field, in general machine shops, foundries, and die shops is described in detail.

Machines illustrated range from heavy duty models to commercial and intermittent duty types, and include bench and floor models and suspended models in direct drive, multi-speed drive, and two-speed geared drive. Copy of Bulletin FS-41 free upon request.

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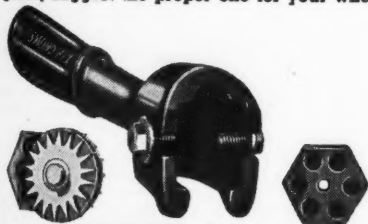
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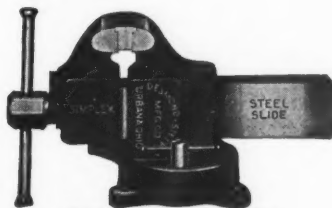
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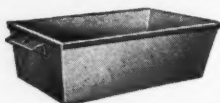
Whitman & Barnes Catalog No. 97. Whitman & Barnes, 2108 W. Fort St., Detroit, Mich., has issued a catalog containing 166 pages which illustrate and list various types of drills, reamers, counterbores, screw extractors, interchangeable punches, and so on. In addition, the catalog includes valuable information pertaining to the design, construction, use, and care of drills and reamers.

The cover is of the Box-Bak type and is deeply embossed. Mechanical wire binding permits the catalog to lie flat when opened, and large legible type

throughout provides easy reading. Copy of Catalog No. 97 free to mechanical executives upon request.

Crucible High Carbon High Chromium Die Steels are the subject of an eight-page folder published by the Crucible Steel Co. of America, 405 Lexington Ave., New York, N. Y. The chief characteristics of these steels, such as their exceptional resistance to wear and graduations in toughness due to variations in carbon and molybdenum content, are discussed together with other features. Copy of folder free upon request.

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20" long x 12" wide x 6 1/2" deep.
16 ga., drag holes and handles both ends.

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"New Wings for Production." New facts on the way in which leading aircraft plants are meeting their "tooling-up" crisis are revealed in an attractive 16-page booklet, "New Wings for Production," released by the Delta Mfg. Co., 601 E. Vienna Ave., Milwaukee, Wis. Numerous photographs of actual air plant set-ups show some of the secrets of the amazing growth in production capacity of such concerns as Bendix Aviation Corp., Consolidated Aircraft, Jacobs Aircraft Engine Co. and North American Aviation. In particular, the booklet emphasizes the clever adaptations of Delta precision machines—drill presses, cut-off machines, metal-cutting band saws, and circular saws—to meet the urgent needs of the rapidly expanding aircraft industry.

Of unusual interest is a series of photographs of special set-ups made with standard drill press parts for use in airplane engine production. As noted, the equipment and set-ups illustrated and described in the booklet are also used in other plants in addition to those mentioned above.



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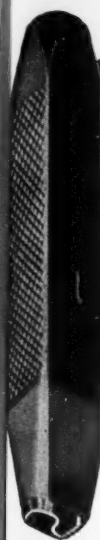
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Peerless High Duty Metal Cutting Power Saws. A 12-page bulletin published by the Peerless Machine Co., Racine, Wis., contains action pictures and metal-cutting data which is said to be of special help to companies having defense contracts for heavy artillery. Especially interesting are illustrations of machines sawing square billets for shell forgings, round stock for rifle barrels, and tool steel as required for new forging dies.

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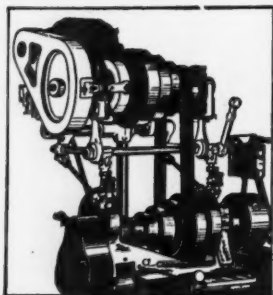
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for LATHES, SHAPERS, DRILLS, MILLING MACHINES, etc.

1040, 1050, and 1340, there is a page on cutting speeds for all materials ranging upward from low carbon bars to thin wall tubing. A table on blade recommendations covers numerous combinations of speeds, feeds, and materials which can be cut with Peerless Hydraulic Automatic Saws. Copy of Bulletin 50-A free upon request.

Barnesdrill No. 1 Horizontal Hydraulic Honing Machine. A four-page illustrated bulletin describing the features, advantages, and so on, of the Barnesdrill No. 1 Horizontal Hydraulic Honing Machine for honing long bores up to 1½ in. in diameter is now being issued by the Barnes Drill Co., 814-816 Chestnut St., Rockford, Ill. Specifications are included. Copy of Bulletin No. 147 free upon request.

Magnus Drawing Lubricants Bulletin. Magnus Chemical Co., Inc., Garwood, N. J., has issued a four-page bulletin entitled "Magnus Drawing Lubricants for Dry and Wet Drawing of Ferrous and Non-Ferrous Wire." The bulletin thoroughly discusses the qualities that should be sought for in wire drawing lubricants.

Under the heading "Dry Drawing," the bulletin discusses the drawing of medium and low carbon steel wire, high carbon and stainless steel wire, and high speed continuous drawing of low carbon steel. The section devoted to wet drawing covers the drawing of steel, bronze, and brass wire, fine Moneo or stainless steel wire, fine steel wire, and copper, brass, and bronze wire. Another section describes materials for grease drawing of wire. There are also separate sections on wire coating, wire cleaning, and rust protection. Copy of bulletin free upon request.

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Easily operated and quickly bolted in tee slots of universal tool grinder or cutter and reamer grinder.

Fixture table lengthened by 6" to prevent "overhang" of long high speed power hack saw blades.

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A.C. ARC WELDERS

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MARQUETTE MANUFACTURING CO., INC. MINNEAPOLIS, MINN.

South Bend Lathe Catalog No. 52. A condensed catalog describing the entire line of South Bend Lathes has been issued by the manufacturer—South Bend Lathe Works, South Bend, Ind. Containing only eight pages, this 8½ x 11-in. catalog may be placed in a binder or filed in a standard letter file. The condensed data include illustrations, basic dimensions, capacities, speeds, and feeds of back-geared, screw cutting lathes having 9, 10, 13, 14½, and 16-in. swings and bed lengths from 3 to 12 ft. In addition, numerous attachments for toolroom and production work are illus-

trated and described.

Copy of Catalog No. 52 is available upon request from the South Bend Lathe Works, Dept. 4Z, South Bend, Indiana.

Trico Electrical and Lubricating Devices Catalog No. 50. Published by Trico Fuse Mfg. Co., 2948 N. 5th St., Milwaukee, Wis., this catalog contains valuable information on how maximum fuse protection can be obtained by removing and replacing fuses safely, eliminating poor contact between fuses and clips, and lubricating all types of bearing surfaces with modern, visible, automatic oiling devices. Copy free upon request.

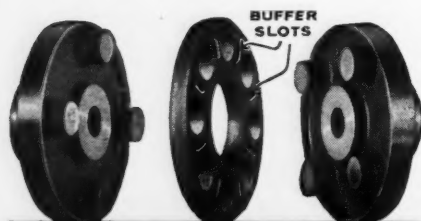
Carboly Standard Tool Catalog. An eight-page catalog covering its complete expanded standard tool line has been released by the Carboly Co., Inc., 11143 E. 8 Mile Rd., Detroit, Mich. Designated as the No. GT-129, the catalog contains tables giving complete specifications and prices of all sizes of standard tools now available in 10 basic styles and to be carried in stock in grades for machining steel, cast iron, non-ferrous metals, and so on. Accompanying the tables are photographs of the tools together with dimensional drawings.

The catalog also includes prices and specifications of Carboly standard blanks which are available in two styles, 65 sizes, and three grades. A feature of the catalog is the provision of drawings showing how special tools may be quickly obtained in the plant by simple grinding operations performed on standard tools. Copy of Catalog No. GT-129 free upon request.

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It gives you greatly increased benefits from your Motor Drives by combining the flexibility of the Belt Drive with the economy of the Direct Drive and eliminating the defects of both.

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Types 1A and 2A Provide up to 3 to 1 Ratio with Power Ratings from Fractional to 4 H.P.

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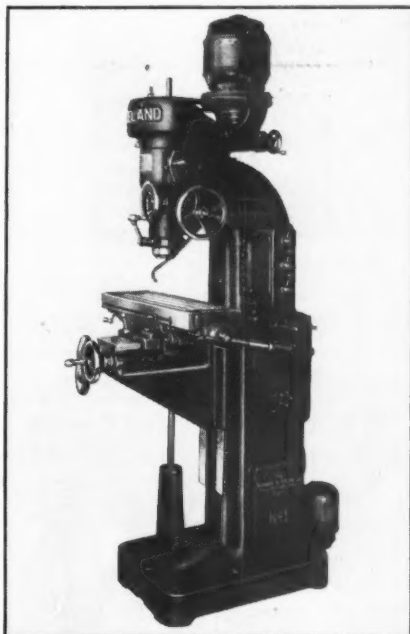


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Greatest Distance Between Standards	20"	30"	30"	66"	88"
Capacity in lbs.	1,000	2,000	2,000	5,000	10,000

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A standard high-speed Vertical Spindle Milling Machine designed to meet the most exacting requirements; built to give the highest standard of performance.

Specifications and full information on request

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Tri-Clad Induction Motor. Catalog GEA-3580 now being issued by the General Electric Co., Schenectady, N. Y., gives many interesting highlights on the design, construction, and application of the General Electric line of Tri-Clad motors. Well illustrated, concise and graphic in style, this 12-page catalog literally takes the motor apart to show how extra protection has been built into the Tri-Clad line of motors. Particular attention is called to the motor's one-piece, cast iron frame and end shield for protection against physical dam-

age; the stator windings of tough Formex wire for protection against electrical breakdown, and the new design of bearings for protection against operating wear and tear.

Other photographs in the catalog show the many types of Tri-Clad motors now available and some typical industrial applications. Copy free.

Gear Checking. A four-page folder on the procedure to be followed in the checking of internal spur and helical gears on the Fellows Involute Measuring Machine has been published by The Fellows Gear Shaper Company, 78 River St., Springfield, Vt. The information given in this folder supplements that given in a previous circular entitled "Fellows Involute Measuring Machine." Copy free upon request.

Ampco Metal. The ability of Ampco Metal, a copper, high-aluminum, high-iron alloy, to safeguard the vital points in industry's outstanding mechanical equipment is described in "Brief Facts About Ampco Metal," a 16-page illustrated booklet issued by Ampco Metal, Inc., 3830 W. Burnham St., Milwaukee, Wis. The six grades and modifications of Ampco are described and illustrated by photomicrographs, and the importance of Ampco's complete laboratory and testing equipment in the control and process of producing the aluminum bronze metal is emphasized.

Space is devoted to Ampco Rotocasting—the improved centrifugal casting method which is achieving new importance in casting special shapes centrifugally. Ampco's use as a corrosion and acid-resistant material is also discussed in the booklet, copy of which is available free upon request.

BARNES BETTER Hack Saw BLADES

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STEVENS ROTARY TABLES STANDARD AND DIAL TYPES

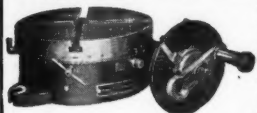
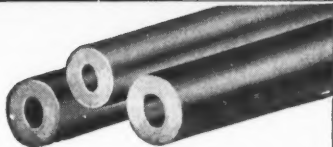


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TOOL STEEL TUBING



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THE PRECISION UNIVERSAL TOOL HEAD

ADJUSTABLE
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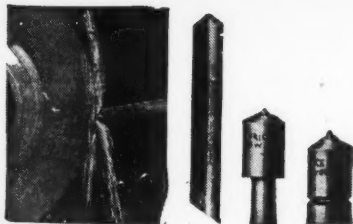
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Immediate delivery made of all types of diamond tools from our complete and large stock.

Now in our 100th year in the Industrial Diamond Business.

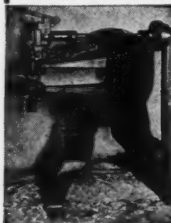
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"Dessau Diamonds True the Wheels of Industry"

Alphil Spot Welders. Illustrated and descriptive information on the various types of spot welders marketed by the Alphil Spot Welding Co., 431 W. Broadway, New York, N. Y., is given in a four-page folder prepared by this firm. Copy free upon request.

Neu-T-rol Magnetic Chuck Control is the subject of Bulletin No. 21 now being distributed by the manufacturer of the control—Electro-Matic Products Co., 2235 N. Knox Ave., Chicago, Ill. The Neu-T-

rol releases the workpiece from the chuck and demagnetizes the workpiece as it releases it. Complete details on the Neu-T-rol and the manner in which it operates are given. One section of the bulletin presents a number of photographs of machines on which these controls have been installed and gives data about the installation. Copy of Bulletin No. 21 free upon request.

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**GRAY, Originator of First
Practical Metal Cutter or
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Most modern Nibbler for Template Cutting, Tool Rooms, Shipbuilding, Aircraft Parts, Aircraft Tubing, Sheet and Plate Shops.

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Box 596, Philadelphia, Pa.

"Hygrade Lighting News." Hygrade Sylvania Corporation, Salem, Mass., launched recently the first issue of "Hygrade Lighting News," a house organ for the electrical trade. The publication is an attractive eight-page, two-color, 8½ x 11-in. folder, consisting of four pages of news and promotional items and four pages of technical material of an informational nature.

"Hygrade Lighting News" will be mailed regularly each month to a list of approximately 30,000 names. Its theme will be "what's new in lighting," and it will contain news and technical data on both fluorescent and incandescent lighting.

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Nine Danly Branch Stocks Provide 24-Hour Service for 95% of All Metal Fabricating Plants.

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Mahr Equipment Bulletin No. 100. A four-page bulletin illustrating and describing the construction features, and so on, of Mahr Tool Furnaces is now being issued by the Mahr Mfg. Co., Division of Diamond Iron Works, Inc., Minneapolis, Minn. The bulletin treats two types of furnaces; namely, the Series 100-Underfired, which has a temperature range of 1,200 to 2,000 deg. F., and the Series 200-Over and Underfired, which has a temperature range from 2,100 to 2,600 deg. F. Complete specifications for each type furnace are presented in tabular form. Copy of Equipment Bulletin No. 100 free.

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Features include: transformer which guarantees faster heat, stronger welds; water cooled electrodes and tips; automatic trip switch; adjustable arms; swivel pedal; and heat regulator. If you have any production problems—consult us.

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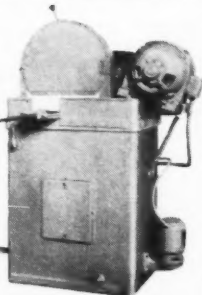
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The CATSKILL Wet-Type Abrasive Cut-Off Machine

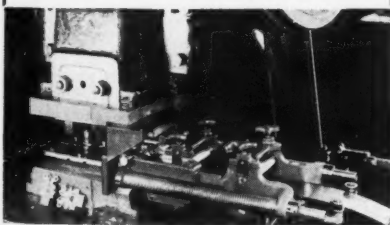
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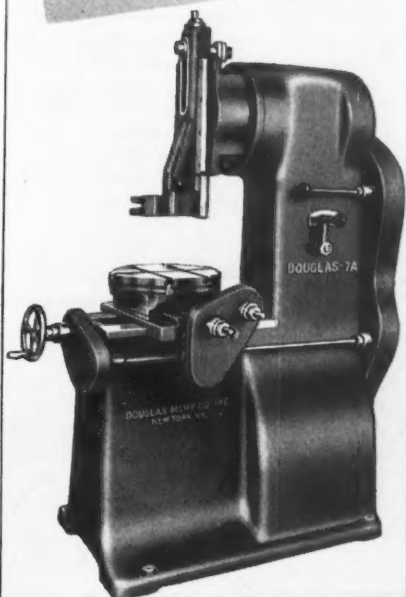


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7 1/2", 8 1/2", 10" STROKE

Universal Adaptability
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Swiveling Head,
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High Speed and Accuracy.

QUICK DELIVERIES

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Hobart Welding Electrode Handbook. A revised, 20-page handbook of welding electrodes and accessories is now available free of charge from the Hobart Bros. Co., Box EW-79, Troy, Ohio.

Despatch Tempering and Drawing Furnaces. Bulletin No. 83 now being issued by Despatch Oven Company, Minneapolis, Minn., outlines the many outstanding features of the Despatch CF line of tempering and drawing furnaces and gives many helpful suggestions on

how to improve tempering and drawing results. Copy free upon request.

Midwest Metal-Cutting Tool Catalog No. 17. Midwest Tool & Mfg. Co., 2360 W. Jackson Ave., Detroit, Mich., is now issuing a 192-page illustrated catalog containing information on metal-cutting

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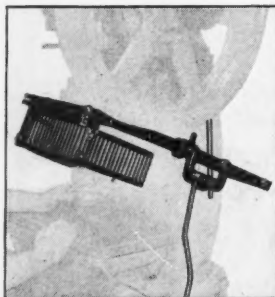
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Attach this advertisement to your card or letterhead, fill in the bottom line and mail to us. We will send you a free trial sample. Or if you prefer send \$1.00 for Special 33 wheel assortment.

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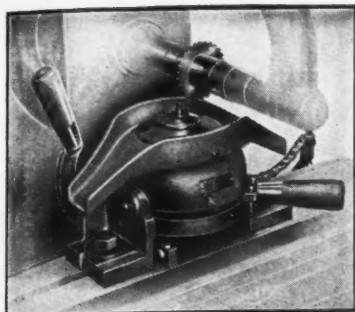
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tools and holders, including counterbores, countersinks, drills, end mills, form tools, keyway cutters, reamers, spot facers and spot-facer bars, adjustable extension holders, floating holders, and cemented carbide-tipped tools. The photographs and drawings showing the various types of tools and holders have identifying style numbers in conjunction with accompanying specifications, tables of sizes and dimensions. Tables of feeds and speeds, cutter sharpening data, conversion tables, and other useful information are also included. Copy of Catalog No. 17 free to mechanical executives upon request.

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Work held by draw in collets. Collets open and close automatically. Work automatically ejected. Indexes without loss of time for milling 1, 2, 3, 4, 6, 8, 12 or 24 sided pieces. Minimum set-up time required. Speeds up production. Positive and accurate in operation.

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Scientifically designed,
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cuts all types of oil grooves straight
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Stationary chuck and upright spindle
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Chucking arrangement permits groov-
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"For Cast-Iron Welding" is the title of Bulletin GEA-3493 now being distributed by the General Electric Co., Schenectady, N. Y., covering the G-E Type W-83 Shielded-Arc Electrode. Copy free upon request.

Cratex Abrasive Wheels and Points for fine grinding and polishing are the subject of a six-page illustrated folder prepared by the Cratex Mfg. Co., 81 Natoma St., San Francisco, Cal. The folder lists the various sizes of the Cratex Wheels and Points and describes

"3-IN-ONE" OIL SAVES REPAIR COSTS ON HIGH-SPEED EQUIPMENT

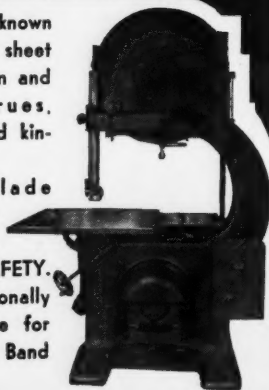
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Fastest and best known means of cutting sheet steel, aluminum and magnesium sprues, gates, risers, and kindred items.

Provides sawblade travel of over 2-miles per minute with PERFECT SAFETY. Cuts are exceptionally smooth. Write for Metal Cutting Band Saw Bulletin.



THE TANNEWITZ WORKS
GRAND RAPIDS, MICHIGAN

the five grits in which these wheels and points are available; namely, coarse, medium, fine, S. T. 120, and extra fine. Copy free upon request.

Sheet Lifters. An interesting illustrated booklet known as Bulletin SL-21 which describes C-F Sheet Lifters has been prepared by Cullen-Friedstedt Co., 1300-P S. Kilbourn Ave., Chicago, Ill. These modern machines for lifting and carrying sheet steel and other hand-to-handle material are widely used for speed and economy where loads from 2 to 60 tons or larger must be moved with maximum safety to men and materials. Many varied applications of C-F Lifters are shown with photographs of machines of various capacities, all under "one-man" positive control which provides infinite adjustment to load. Copy of Bulletin SL-21 free upon request.

"More Power to You" is the fact-revealing story of the Allis-Chalmers Super-7 V-Belt contained in Bulletin B-6190 released by Allis-Chalmers Mfg. Company, Milwaukee, Wis. Presenting the points of differences in this latest Texrope V-belt, the eight-page letter-size booklet explains how the Super-7 provides longer life and greater efficiencies than previous belts because of 20 per cent more and 50 per cent stronger cords, new cushion rubber zone and duplex-sealed cover.

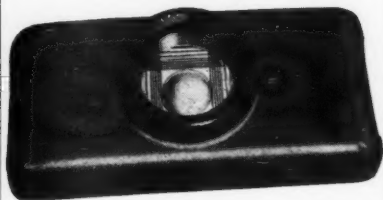
The "Flexon" process of making pulling cords which combine flexibility, strength, and low stretch in Super-7 V-belts is also announced. Additional pages offer a handy selection table, as well as price lists for V-belts now available from stock. Copy of Bulletin B-6190 free upon request.



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LEAD

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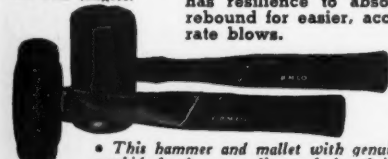
WOOD
makes a clumsy tool that will split and crack.

METAL
has edges that turn, break and fly off.

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makes a bouncing head that chins and smears.

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heads and faces stay accurate, absorb shock and wear longest.

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Geometric 3/16-In. Style EJ5 Solid Adjustable Die Head for small diameter fine pitch threads is illustrated and described in a four-page bulletin issued by The Geometric Tool Co., New Haven, Conn. Copy of Bulletin EJ5-1 free upon request.

"The Minute Men of Metal Joining" is the title of a four-page illustrated folder released by Handy & Harman, 82 Fulton St., New York, N. Y., describing

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ing Sil-Fos and Easy-Flo low temperature brazing alloys. The folder contains complete information on these materials as to features, uses, and advantages, and is available free upon request.

"Budgit" Crane Assemblies. Shaw-Box Crane & Hoist Division, Manning, Maxwell & Moore, Inc., 440 Broadway, Muskegon, Mich., has prepared for distribution an eight-page bulletin, designated as the No. 349, illustrating and describing "Budgit" Top - Running Bridge Crane Assemblies, Jib Crane Assemblies, and Underhung Bridge Crane Assemblies. Copy free upon request.

Michigan Bulletin No. 270. A 44-page bulletin of special value to gear production men and engineers is now being published by the Michigan Tool Co., 7171 E. McNichols Rd., Detroit, Mich. Designated as the No. 270, the bulletin presents in simple form short cuts of practical every-day assistance to those engaged in the cutting and checking of gears. Included are change gear formulas and tables for hobbing machines, formulas and tables for checking gears by the ball method and pin method, a table on hobbing speeds, complete tables of decimal equivalents of fractions for use with the change gear formulas, and so on, as well as hob-checking equipment information and formulas for calculating hobbing time. To make the bulletin of most practical use, actual examples applying the formulas are given in each case.

Copy of Bulletin No. 270 is available free of charge to users of "Mitco" ground form gear cutting tools, "Michigan" gear production and "Sine-Line" gear checking equipment, as well as shop executives and engineers engaged in producing gears.

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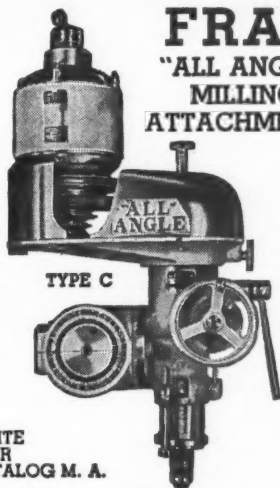
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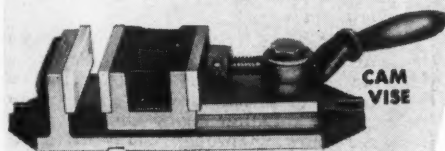
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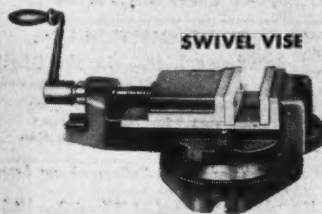
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Hannifin Sensitive Pressure Control Bulletin No. 50. A four-page illustrated bulletin describing a sensitive pressure control for Hannifin hydraulic presses is now being distributed by the Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago, Ill. Copy free upon request.

"Introducing 3 New Beauties" is the title of a four-page bulletin released by Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo, Mich., illustrating and describing three "OK" grinders for tools and light snagging;

namely, the Hammond OK "10," OK "12," and OK "14." Complete specifications for each grinder are included. Copy of Bulletin GP-12 free upon request.

Wodack Electric Tools for construction, installation, production, and maintenance are the subject of Catalog 45 announced by the Wodack Electric Tool Corp., 4627 W. Huron St., Chicago, Ill. Among the tools described in this eight-page catalog are portable electric drills, combination hammers and drills, wraggers, combination sanders and grinders, disc sanders or edgers, grinders, and so on. Copy free upon request.

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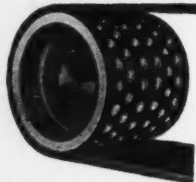
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Morse Roller Chain Engineering Data Bulletin No. R-54. A 24-page bulletin on roller chain engineering data has been made available to power transmission engineers, plant executives, and designers by the Morse Chain Co., Ithaca, N. Y. The bulletin contains complete and detailed information on construction, capacities, and applications of Morse Roller Chain, a drive which is said to be completely interchangeable with all other round pin roller chains yet, through an ingenious design, contains a positive oil feed system in every link.

The list of contents includes power transmission capacity tables for pitches from $\frac{3}{8}$ to $2\frac{1}{2}$ in., a guide for the calculation of chain lengths, tables showing sprocket dimensions and types, features showing proper chain drive layout, a discussion of types of oiling systems, and a wealth of other valuable roller chain drive information.

Copy of Bulletin will be sent to all of the aforementioned men upon request.

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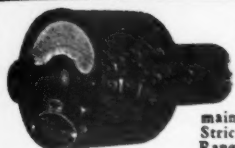
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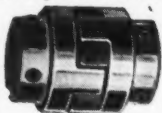
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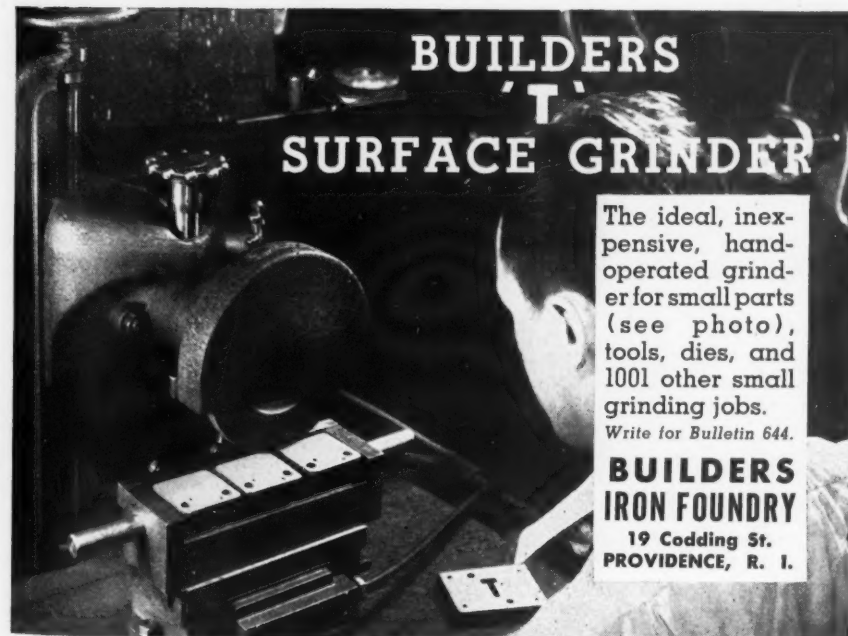
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"Hawk Prefak," a pre-tested, pre-ground die steel of the oil hardening type, is the subject of a four-page folder issued by Hawkrig Bros. Co., 303 Congress St., Boston, Mass. Copy free upon request.

"Hallowell" Steel Work-Benches and Factory-Equipment," product of Standard Pressed Steel Co., Box 556, Jenkintown, Pa., is featured in a 24-page bulletin now being distributed by this firm. Equipment described and illustrated includes a variety of work benches, bench legs, bench drawers and cabinets, tool



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stands, and other items of factory equipment. Specifications are given for each piece shown. Copy of the bulletin free upon request.

Olsen Impact Testing Machine with "Chang-O-Matic" head for use in making Charp, Izod, and Tension Impact Tests is the subject of an eight-page bulletin, designated as the No. 22, now being distributed by the Tinius Olsen Testing Machine Co., 500 N. 12th St., Philadelphia, Pa. The bulletin illustrates and describes in detail the construction features, operation, and application of the machine and gives specifications, dimensions, and weights. Copy free upon request.

"Individualized Inco Nickel Alloys" is the title of a 12-page catalog now being published by The International Nickel Co., Inc., 67 Wall St., New York, N. Y., giving individual characteristics, mechanical properties, and application information on Inco Nickel Alloys—Monel, "K" Monel, "KR" Monel, "S" Monel, "R" Monel, Nickel, "Z" Nickel, and Inconel. Tables of physical constants and available forms are included. Copy free upon request.

Conco Materials Handling Equipment. A leatherette covered catalog consisting of a series of bulletins containing illustrated, descriptive, and tabular information on Conco Jib Cranes, I-Beam Trolleys, Electric Hoists, Underhung Cranes, Hand Chain Hoists, Top-Running Cranes, Electric Traveling Cranes, and so on, has been prepared for distribution by the Conco Engineering Works, Division of H. D. Conkey & Co., Division St., Mendota, Ill. Copy free to mechanical executives upon request.



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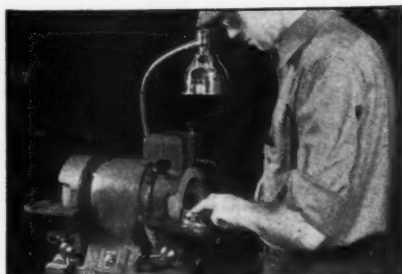


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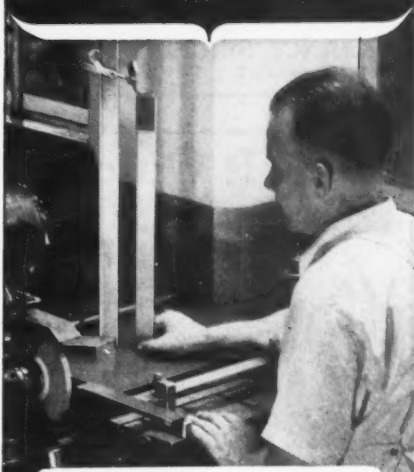
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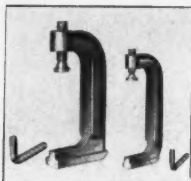
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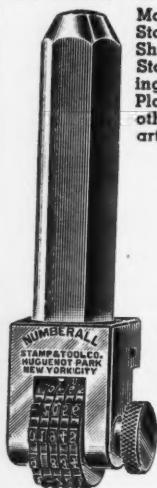
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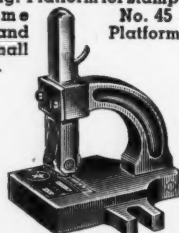
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Kennametal Toolroom Chart No. 6, which has been printed on an inch rule and a protractor for measuring tool dimensions and angles, is now being distributed by McKenna Metals Co., 300 Lloyd Ave., Latrobe, Pa. The chart also shows the chip breaker design on a Style No. 11 Kennametal tool for turning bar stock and forgings, as well as an efficient tool design for a facing tool for turret lathes. Chart No. 6 free upon request.

"Metcolizing" is the title of an eight-page bulletin describing a process for the economical and efficient protection of iron, steel, and in some cases copper and bronze, against oxidation and scaling at elevated temperatures, and for the protection of nickel and nickel chrome alloys against attack by sulphurous gases. Published by Metallizing Engineering Co. Inc., Long Island City, N. Y., this bulletin also contains illustrations of typical metcolizing jobs as well as a list giving the types of equipment most commonly Metcolized. Copy of Bulletin P-11 free upon request.



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Tools for J & L Turret Lathes. The Jones & Lamson Machine Co., Springfield, Vt., is now publishing a 58-page catalog covering the complete line of tools and attachments available for J & L Turret Lathes. The catalog is divided into three sections: the first contains photographs and general descriptions of J & L Universal Turret Lathe Tools; the second, dimensional diagrams with reference tables showing the exact dimensions in which each of these tools is available for a particular machine.

and the third, photographs and descriptions of tools for J & L Flat Turret Lathes.

The catalog has an imitation leather cover and is Wire-O bound to allow for the insertion of new sheets that will be mailed to men receiving the catalog as the sheets are issued.

Copy of the catalog will be sent free of charge to any mechanical executive who will address a request on his company letterhead.

Littell Patented Automatic Centering Reels for use with brass, zinc, copper, stainless steel, cold and hot rolled steel coil stock, and so on, are described and illustrated in a four-page bulletin issued by the F. J. Littell Machine Co., 4162 Ravenswood Ave., Chicago, Ill. Specifications are listed. Copy of Bulletin 5-C free upon request.

G & E Universal Manufacturing Gear Hobbers. Complete information regarding the uses, constructional features, advantages, and specifications of G & E 12H, 16H, 24H, 36H, 48H, 60H, and 72H Universal Manufacturing Gear Hobbing Machines is contained in a profusely illustrated 28-page bulletin published by Gould & Eberhardt, Irvington, N. J. Copy of Bulletin No. 218 free upon request.



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